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THE

NATURALIST:

A QUARTERLY JOURNAL OF

Natural History for the North of England

EDITED BY

W. A. SLEDGE, Ph.D., B.Sc.,

THE UNIVERSITY, LEEDS,

with the assistance as referees in special departments of

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PRINCIPALLY FOR THE NORTH OF ENGLAND

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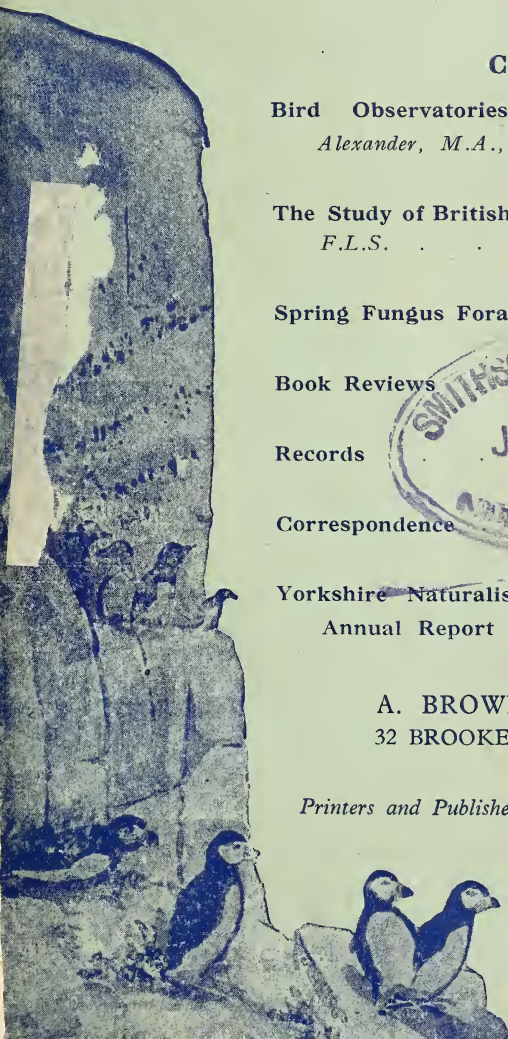

Contents

	PAGE
Bird Observatories and Migration—*W. B. Alexander, M.A., M.B.O.U.*	1-8
The Study of British Plants—*R. D'O. Good, M.A., F.L.S.*	9-11
Spring Fungus Foray—*W. G. Bramley*	11-12
Book Reviews	8, 13-17
Records	18
Correspondence	18
Yorkshire Naturalists' Union: Eighty-Seventh Annual Report	19-40

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THE NATURALIST

FOR 1949

BIRD OBSERVATORIES AND MIGRATION

W. B. ALEXANDER, M.A., M.B.O.U.

Presidential Address to the Yorkshire Naturalists' Union, Scarborough, December 4th, 1948.

In the first place I wish to thank you for the honour you have done me in electing me your President for 1948 and to express my regret that I have only been able to attend one meeting and excursion during my period of office. I can truthfully say that I have rarely been so surprised as I was when I received a letter from the Secretary of the Union asking if I was willing to be nominated as President, and this not only on general grounds but because my connection with Yorkshire and Yorkshire natural history has, unfortunately, been comparatively slight.

But I have no doubt that a hereditary interest in natural history in several members of my family has been derived from descent from two families of Yorkshire naturalists. My great-great-grandmother was a Fothergill of the family of that name whose home for several generations was at Carr End on the shores of Semer Water in Wensleydale. Before her marriage my ancestress kept house for her uncle, Dr. John Fothergill (1712-1780), one of the leading medical men of his time, who was also prominent as a botanist and horticulturist. Sir Joseph Banks wrote that Fothergill's collection of plants in his garden at Upton, now West Ham Park, was ' equalled by nothing but royal munificence, bestowed upon the botanic gardens at Kew. In my opinion no other garden in Europe, royal or of a subject, had nearly so many scarce and valuable plants.' The glasshouses contained some 3,400 species of plants from warm countries, whilst nearly as many more species flourished in the open. He introduced into cultivation nearly 100 species, including *Oenothera Lamarckiana*, the Evening Primrose, since so much studied by students of heredity ; and Linnaeus named after him a genus *Fothergilla*. Among the correspondents who sent him seeds was John Bartram, after whom Audubon named Bartram's Sandpiper, and Fothergill paid the expenses of his son, William Bartram, on his journeys in Georgia and Florida, the account of whose travels is now reckoned a classic of American exploration.

In *The Naturalist* for 1922, Sir Hugh Gladstone published a paper on ' The Fothergill Family as Ornithologists,' so I will only remind you that in 1799 Charles Fothergill published at York *Ornithologia Britannica*, a list of British birds with short notes on each species and that Dr. John Fothergill, of Askrigg, later of Darlington, contributed a list of the birds of Wensleydale to Whitaker's *History of Richmondshire* (1823), one of the earliest local lists of Yorkshire birds.

The most remarkable ornithological event connected with the Fothergill family occurred in 1805 when William Fothergill, who then owned the family estate at Carr End, noted : ' On the 6th of September during a tremendous thunderstorm a bird of which a correct description follows, was observed flying about in Shaw Gill, near Simonstone, and alighting upon a tree was knocked down by a stick thrown at it, which however did not prove fatal, as I saw it alive and had an opportunity of carefully examining it four days after it was taken.' A detailed description followed, concluding ' Suppose it to be the Swallow-tailed Falcon,' a supposition which the description shows to be correct, the bird being the American Swallow-tailed Kite (*Elanoides furcatus*). Subsequently the following note was added, ' The bird was kept to the 27th, and then made its escape, by the door of the room being left open while shewing to some company. At first it arose high in the air, but being violently attacked by a party of Rooks, it alighted in the tree in which it was first taken. When its keeper approached, it took a lofty flight towards the south, as far as the eye could follow, and has not since been heard of—[Signed] W. Fothergill, Sept. 30th, 1805.'

In 1823 a notice of this occurrence appeared in the *Transactions of the Linnean Society* (Vol. XIV, p. 583) and in 1828 Fleming included the Swallow-tailed Kite as a rare straggler in his book on *British Animals*, noting that Dr. Walker, Professor of Natural History in the University of Edinburgh, had recorded in his manuscript journal for 1772 that one had occurred at Ballachulish in Argyllshire.

The species was included in all books and lists of British birds published during the next 60 years. In 1871 in the 4th edition of Yarrell, Professor Newton, who had seen the original note by W. Fothergill, then in the possession of his grandson,

JAN 27 1949

William Fothergill, wrote : ' Unaccountable then as the fact may be, it rests on the evidence of perfectly competent witnesses and there is accordingly no room for doubt in this case.'

However, in Howard Saunders' Manual, published in 1889, after a brief allusion to the event he added, ' There is reason to suppose that the bird in question had been in confinement,' and since that time the species has been removed from the British list, authors who referred to it saying that the evidence was unsatisfactory and referring to Saunders' statement. It would appear that Saunders held that the fact that the bird escaped after three weeks of captivity suggested that it must have been in captivity and escaped previously.

Personally I fail to see any cogency in this argument and think that the Swallow-tailed Kite has as good a claim to a place on the British list as any other species which has been captured or killed on a single occasion in the British Isles. The question whether species which have only occurred once should be placed on the British list is one which I will not now stop to discuss. That is the basis on which the present list is compiled.

My maternal grandmother was a member of another Yorkshire family which has produced several naturalists, being the daughter of James Backhouse of York. As a young man he had explored Upper Teesdale and was the discoverer of many of the interesting alpine plants of that district and in his later years, during his missionary travels in Australia and Tasmania, he studied the flora of those regions and the Australian genus *Backhousia* was named in his honour. His son, the second James Backhouse of York, was an authority on the genus *Hieracium*, and constructed the first modern rock garden in the nurseries at Acomb, near York. His son, the third James Backhouse of York, was the author of a useful *Handbook of European Birds* published in 1890, and his collection of bird-skins is now in the York Museum.

Whether I am right or not in considering that I inherited an interest in natural history from my Fothergill and Backhouse ancestors there is no question that that interest was greatly stimulated during my schooldays at Bootham School, York, which, as you are doubtless aware, possesses the oldest school natural history society in the world. Bootham old boys have been Presidents of the Yorkshire Naturalists' Union on two previous occasions—J. G. Baker, the botanist in 1882-3, and Henry Seebohm, the ornithologist, in 1893. It was during my school days that I read Seebohm's two books, *Siberia in Europe* and *Siberia in Asia*, which were subsequently republished in a single volume called *The Birds of Siberia*. In these fascinating volumes there are vivid accounts of the ending of winter and the break-up of the ice on the great rivers Petchora and Yenisei, and the simultaneous arrival of large numbers of many species of migratory birds which breed north of the Arctic Circle in the forests or on the tundra. In each book there is a chapter on migration, the earlier one containing an account of his observations on Heligoland and the later of observations on the south-west coast of France.

In 1896 the President of the Union was John Cordeaux, who made important observations on migration in the Humber region and acted as Secretary of the Committee of the British Association which collected observations from light-houses and lightships round the British Isles during the years from 1879 to 1887. Ten years later (in 1906) the Union's President was William Eagle Clarke, who compiled reports on the migrations of various species based on the data collected by the British Association Committee supplemented by the observations he himself made on several of the more remote and isolated British islands and during visits to the Eddystone lighthouse and the Kentish Knock lightship. His book, entitled *Studies in Bird Migration* published in two volumes in 1912, remains the classic on migration as it affects the British Isles.

I have not looked up the addresses which these three ornithologists delivered to the Union, and do not know whether they dealt with migration, but their conclusions on the subject were necessarily entirely based on observation, and obviously they could only surmise where the birds they observed were coming from and going to. It is true, of course, that when such a bird as the Yellow-browed Warbler appears on our coast we may be sure that it has come from Northern Siberia since the Urals form the western boundary of the breeding range of the species, but it is certainly not safe to assume that other birds which arrive with it had the same origin. It may have only joined them at some, perhaps recent, stage of its journey. In some other cases, where the British individuals of a

species show a constant difference in colour or other features from Continental individuals of the same species, examination will indicate whether a particular flock arriving on our coast has come from further north in Britain or has crossed the North Sea. But in the majority of widespread common migratory species such criteria are lacking.

MARKING OF INDIVIDUAL BIRDS

Since about the beginning of the present century much new light has been thrown on the facts of migration by the marking of individual birds and their subsequent recovery at a distance from the point of marking. On various occasions in earlier periods naturalists had marked occasional individuals and had shown, for instance, that Swallows return to their previous year's nests or to the same building to breed in successive years. But the first attempt to mark birds on a considerable scale by putting inscribed rings on their legs was that of Lord William Percy, who, from 1890 for a number of years, marked numbers of young Woodcock on the Duke of Northumberland's estate at Alnwick. In 1899 Mortensen started a more comprehensive scheme in Denmark and in 1903 a scheme was started at the German Ornithological Society's bird observatory at Rossitten on the Baltic coast of East Prussia. Within the next few years bird marking was begun in various other countries and in 1909 comprehensive schemes were started in Britain by Dr. Landsborough Thomson at Aberdeen University and by the late H. F. Witherby through the readers of the magazine *British Birds*. As you are doubtless aware this latter scheme is still in operation having been transferred by Mr. Witherby before his death to the British Trust for Ornithology and granted headquarters at the British Museum (Natural History).

Birds can be obtained for ringing in two ways. The rings may be placed on the legs of nestlings or chicks before they can fly in the case of those birds whose legs are nearly or quite full-sized before their wing-quills have developed, and this is the case with most birds except game birds and water-fowl. The alternative is to catch birds after they can fly by any method, trapping or netting, which does not injure them.

The ringing of nestlings has the advantage that the birthplace and the age within a few days of the ringed bird are known, but it has the disadvantages that ringing is confined to the species which breed in the country and to a few months of the year and that the proportion of recoveries at a distance is very low owing to the high rate of mortality among young birds just out of the nest. On the other hand the ringing of birds which can already fly enables the work to be carried out throughout the year and to be applied to all species, and yields a higher proportion of recoveries ; but the birthplace of a captured bird cannot be known and in many cases there is no clue to its age. In practice, however, a high proportion of birds captured are in the plumage of the first year, which is distinguishable from that of adults in very many species. When such a bird is subsequently recaptured its age is known within a year, provided that the fact that it was in first-year plumage when ringed has been recorded.

It must be obvious that to obtain the maximum results from bird-marking both nestlings and trapped birds should be ringed. During the first twenty years of the *British Birds* marking scheme the vast majority of the birds were ringed as nestlings. A few individual ringers did some trapping in their gardens but the numbers caught were small. In 1927 the Oxford Ornithological Society erected a house-trap in Christ Church Meadow which was run co-operatively, different members of the Society visiting it at intervals throughout the day and catching, ringing and liberating any birds found in it.

In the autumn of 1930 I accepted an invitation to come to Oxford to supervise field-work of members of the Ornithological Society and to stimulate and assist in the development of ornithological field work in the country generally. Mr. Witherby had for some time been urging co-operators in the ringing scheme to ring more birds by trapping and to help towards this object I collected information about the various kinds of traps in use and tested as many types as possible at Oxford. In the autumn of 1931 an Oxford party went to Holy Island, Northumberland, which Mr. Witherby had recommended as a likely place for seeing and catching migrants, taking with us various types of traps and nets. Our visit was repeated in the following autumn and in the meantime I had paid a visit to the Swiss Bird Observatory at Sempach and seen in operation some of the bird-catching devices

adopted by Herr Schifferli, bringing back with me one of the small portable Heligoland traps which he had invented.

Our efforts at bird-catching on Holy Island were not very successful, the great majority of our captures being made with the assistance of the islanders by the method traditional there which they called 'leashing,' frightening birds roosting in the hedges at night into herring nets suspended on one side of the hedge by violently beating the other side with sticks. In the light of subsequent experience it is clear that Holy Island is not a very good place for catching migrants, chiefly because it is too large and has too much cover and provides ample food for the birds, so that they are not concentrated nor attracted by artificial bait ; moreover, there is no lighthouse.

In the autumn of 1933 I spent three weeks on Heligoland with Miss M. Barclay and Mr. H. J. R. Pease, who had been in the Holy Island party the previous year. Mr. Witherby and Mr. and Mrs. B. W. Tucker accompanied us, but did not remain so long. We were most cordially received by Dr. R. Drost, the Director of the Bird Observatory, and given every opportunity to see in operation the methods used for catching birds for ringing at this most famous bird-ringing station, though unfortunately on no night during our stay were birds attracted to the lighthouse.

It was clear that one of the main reasons why it was possible to catch so many birds on Heligoland was that there was comparatively little natural cover on the island so that warblers, thrushes, finches and birds of similar requirements were concentrated in the few sheltered gardens in which there were trees and shrubs, the largest of which was the trapping-garden of the Bird Observatory, surrounded by a high wall to keep out cats and with the traps so arranged that birds were driven into them by persons walking along the paths. Of course, the fact that Heligoland is so isolated that great numbers of migrants visit it is also an important factor.

THE FIRST BRITISH BIRDS OBSERVATORIES

The question then arose as to which would be the best place in the British Isles at which to set up a Bird Observatory similar to the one on Heligoland. Fair Isle and the Isle of May were known to be islands sufficiently isolated to attract large numbers of migrants and though the former was pre-eminent in this respect it was so remote that it seemed better to make a start on the latter, which is comparatively easily accessible from Edinburgh. In January, 1934, I gave a lecture on Heligoland to the Royal Physical Society of Edinburgh, at the conclusion of which a resolution to establish a Bird Observatory on the Isle of May was enthusiastically adopted. The Midlothian Ornithological Society obtained permission from the Commissioners of Northern Lights, the owners of the island, and collected funds sufficient for the purchase of the necessary materials for a trap.

Before my visit to Heligoland, in the summer of 1933, I had paid a brief visit to Mr. R. M. Lockley, who was then living on Skokholm off the coast of Pembrokeshire, and who was anxious to try to catch migrants on his island. From pictures and plans of the traps on Heligoland he constructed a small trap of Heligoland type over the currant bushes in his garden in August of that year. In the following summer Mr. Lockley authorised me to announce at the Annual Meeting of the British Trust for Ornithology that he would welcome ornithological visitors as paying guests on Skokholm. In the same autumn he and I with members of the Midlothian Ornithological Club erected a large Heligoland trap on the Isle of May. In August, 1935, a similar large trap was erected on Skokholm. Thus these two Bird Observatories began operations at the same period and both carried on till they had to close down owing to the war. Meanwhile various schools and societies had begun co-operative trapping and ringing of birds more or less on the Oxford model.

It is interesting to note that in 1931, the first year in which the figures were recorded separately, the number of nestlings ringed under the *British Birds* scheme was 22,513 and the number of birds trapped and ringed 7,041, or only 23 per cent. of the total. In 1939 the number of nestlings ringed was 27,834 and the numbers trapped had increased to 27,983 or 50 per cent. of the total.

I fear you may think I have gone into unnecessary detail as to the gradual development in this country before the war of a new type of organisation for the study of bird migration. But as it now seems clear that Bird Observatories will play an important and increasing part in the advancement of British ornithology I have thought it would be of interest to place on permanent record an account of a movement with which I have been closely connected from the beginning.

DEVELOPMENTS SINCE THE WAR

During the past four years, in spite of difficulties of various kinds and delays in some cases due to the slow rate of clearance of temporary military and naval buildings erected during the war, the two original Bird Observatories on the Isle of May and Skokholm have been reopened and new stations have been opened at Spurn Head, on Fair Isle and on Lundy. In 1945 the British Trust for Ornithology, at the request of some of those specially interested, appointed a sub-committee of its Research Committee on which each of these Bird Observatories has representatives and of which I have the honour to be Chairman. The sub-committee has no executive functions, each observatory being operated by its own committee, but its object is to form a link between the Bird Observatories, to co-ordinate their work and to standardise methods as far as possible.

In order to decide what organisations should be entitled to representation on this Committee it has been necessary to define the term Bird Observatory. I believe this term was first used by myself in my article in *British Birds* magazine about the ' Vogelwarte ' on Heligoland as a translation of that German title. By it we understand an organisation established with the primary object of studying the migration of birds both by regular observations carried out during the two seasons of migration and by catching and marking as many migrants as possible. We also consider that it is essential that accommodation should be available on the spot in which ornithologists willing to help in the work are entitled to priority. We do not consider it essential that there should be a resident warden or director of the observatory but it is clearly desirable when funds, facilities and a suitable ornithologist are available. During last season there were resident wardens at Skokholm, Fair Isle and Lundy but not at the Isle of May or Spurn Head.

What are the principal objects of Bird Observatories, what have they accomplished hitherto, and what may we hope to learn from their operations?

In the first place a visit to one of these stations for a week or two in the season of migration is now comparatively easy and was previously a difficult undertaking. Since most migration takes place at night the ordinary bird watcher is aware of it chiefly by the comparatively sudden arrival of various summer birds in spring, within a few days the woods become full of the songs of Willow Warblers and the hedges are alive with Whitethroats. But it is undoubtedly more impressive to see numbers of these and many other species on a wind-swept, treeless headland or a barren island, searching for food in every nook, and to know that they must have arrived across the sea during the night and will mostly have left again during the succeeding hours of darkness. On some dark nights, generally with drizzling rain, migration may actually be seen in progress in the rays of the lighthouse. As I have mentioned I was not fortunate enough to see a ' lighthouse night ' on Heligoland, but Seebohm had that good fortune and has given a vivid account of it in his book. I was, however, privileged to be on the Isle of May one autumn night when for several hours a stream of thrushes of several species, Song Thrushes, Blackbirds, Fieldfares and Redwings, passed the lighthouse, all coming from the north-east, travelling up the beams of light and disappearing again into the darkness. With them were great numbers of Goldcrests and a few birds of other species, and many of the Goldcrests and some of the other birds fluttered against the window-panes where we were able to catch them. Such an experience leaves an unforgettable impression of the mystery of migration.

OCCURRENCE OF RARE SPECIES

The names of the places where Bird Observatories have been established, except perhaps Skokholm, are familiar to readers of books on British ornithology as places where rare birds have been obtained in the past. In future Skokholm will also have to be included, as this autumn a Bonelli's Warbler, a species new to the British list, was captured there. Until I had visited some of these localities I had supposed that such rare birds were very occasional individuals among many thousands of commoner species, but this does not seem to be the case. In the autumn of 1936 during my visit to the Isle of May I saw 11 Flycatchers on the island of which 8 were Spotted (*Muscicapa striata*) and 3 Red-breasted (*M. parva*). In October, 1947, during a visit to the same island, I saw 6 Buntings of which 4 were Little (*Emberiza pusilla*) and two Reed (*E. schoeniclus*). In September of this year on Lundy the only Buntings seen were Lapland (*Calcarius lapponicus*), of which at least three were present.

How can such a high proportion of individuals of rare species be accounted for? Rare species are generally those which are on the confines of their normal range, or even beyond it. That is to say that to reach this country they must have made an exceptionally long journey. I suggest that the birds which alight on isolated, barren islands or headlands are mainly tired birds which settle on the first land they reach regardless of its character, whilst those that are less tired continue their journey till they reach some place more congenial to their habits. Thus the most remote islands are most likely to be visited by a high proportion of birds which have already flown a long way, in other words rare species. In Western Europe Heligoland is pre-eminent as a locality for rare birds ; Fair Isle probably comes second ; and islands comparatively near the coast like the Isle of May, Skokholm or Ushant produce fewer.

Until quite recently the records of such rare birds almost invariably took the form of obituary notices. The older ornithologists considered that it was legitimate to shoot such birds for their skins, or merely to identify them, on the ground that these were lost birds which could never find their way back to their remote breeding grounds. I know of no evidence for this assumption. Now that traps have been erected in these localities and some rare birds are being ringed and liberated every year we may hope some day to get some recoveries which may throw light on it.

SPEED OF MIGRATION

One of the questions concerning migration, which was formerly in dispute, related to the speed with which the journeys are made, and this is one of the cases where ringing of individual migrants, and their recovery later on the same journey, is gradually substituting fact for fancy.

Up to the present the following instances have occurred among birds ringed at British Bird Observatories. A Chaffinch ringed on the Isle of May (by myself) on April 18th, 1937, and recaptured on a steamer in the Baltic off Stockholm 16 days later is the only case on a spring journey. On southward journeys in autumn we have the following : A Wheatear ringed on Skokholm on August 30th, 1938, captured in the Gironde, S.W. France, early in the following month, and another Wheatear ringed on Skokholm on August 7th, 1938, recovered at Rabat, Morocco, early in September. A Meadow Pipit ringed on the Isle of May on September 12th, 1938, was reported in the Gironde 25 days later ; a Spotted Flycatcher ringed on the Isle of May on September 17th, 1947, had reached North Portugal before the end of that month ; and a Cuckoo ringed at Spurn Head on August 3rd, 1947, reached Genoa, N. Italy, 39 days later. Finally, a Willow Wren ringed on the Isle of May on July 24th this year was captured at Spurn Head 11 days later. The last is the first instance of a bird ringed at one Bird Observatory being captured at another and we may hope it will not be the last.

INFLUENCE OF WEATHER

There is still much to be learnt about the influence of weather conditions on migration. I have already referred to the fact that it is only under certain exceptional conditions that birds are attracted by lighthouses. Another phenomenon, which is very noticeable at stations along our east coast, is that little migration is seen during westerly winds, but almost invariably, as soon as the wind becomes easterly or south-easterly, migrants appear in numbers. If, as is frequently the case, easterly winds are accompanied by fog, birds swarm on every island and headland along our east coast and we get a ' rush ' or a ' hold-up.'

Recent observations in Holland on the daylight migrations of Chaffinches and Starlings suggest at least a partial explanation of this problem. Using binoculars with a scale and fitted with a graduated angle, and knowing the size of the birds, it is possible to calculate fairly accurately the height at which they are flying, and it has been found that the main factor on which this depends is the direction of the wind. In following winds the birds migrate at a greater altitude than they do in head winds or cross winds.

It has also been found that the higher birds are flying the less notice they take of the geographical features over which they are passing. If they are flying low and come to a coastline, a low range of hills, or even in some cases the edge of a wood, they show reluctance to cross it and usually turn along it and follow it at least as far as it trends in approximately the right direction. On the other hand

if they are flying high they take little notice of such boundaries and usually continue on their course without altering their direction.

Assuming that these observations hold good for the majority of migrants let us consider whether they throw light on the causes of ' rushes ' on our east coast during south-easterly winds. The general direction of migration in Western Europe in the autumn is from north-east to south-west. South-westerly winds are therefore head-winds and north-westerly and south-easterly winds, cross-winds and winds from any of these directions will cause the birds to fly low. Under these conditions when they reach the North Sea coast they will tend to follow it, the coasts of Norway, Denmark and Holland mainly running from north to south or from north-east to south-west and thus leading them approximately in the right direction. But with a north-east wind, in other words a following wind, the birds will be flying high and will ignore the coastline and continue their flight south-westward over the North Sea.

A north-easterly wind in Denmark and Holland is generally due to the presence of an anti-cyclone over the Norwegian coast, or the northern part of the North Sea, and usually becomes a south-easterly wind on our east coast. By the time the birds have crossed the sea therefore they will experience a cross-wind which will tend to make them fly low and after their long flight many will be tired, so that they are likely to be anxious to rest on the first land they meet with. I suggest that this is the probable explanation of our east coast ' rushes.'

MIGRATION ROUTES

Finally I should like to say something about migration routes. It is of interest to note that these were first laid down by Professor J. A. Palmer, of Finland, as a result of his study of the movements of Arctic sea-birds and water-fowl and he expressly disclaimed their application to land-birds. The routes he claimed to have discovered were either along coasts or along river valleys or *via* chains of lakes. As applied to sea-birds and water-fowl there is little doubt that he was correct in claiming that the majority follow well-defined routes, or ' flyways ' as they are now termed in America.

In the case of land-birds, as I have already stated, when a coastline or a river valley trends in the general direction of their route they tend to follow it when flying low, but if it makes a sharp bend they will leave it at that point and resume their flight overland, or over the sea, in the direction which they were originally following. In the case of a headland running out to the south or south-west streams of autumn migrants may converge on it down both coasts and make their departure oversea from its extremity. Similarly in the case of a gulf or estuary opening to the north-east streams of birds will converge into it along both coasts and will then follow the river valley at its head, if it leads them south-west, or else will strike overland.

Now the east coast of Britain comprises five major inlets which have the character just indicated—the Moray Firth, the Firth of Forth, the Tees estuary, the Wash and the Thames estuary. Yet many writers have maintained that there is an east coast route followed by migrant land-birds in autumn and spring and if you turn to the section on migration under various species of passerine birds in Witherby's *Handbook* you will find it stated that the east coast route is followed. If this means, as it appears to do, that individual birds which pass through the Shetland and Orkney Islands then follow the east coast from Caithness to Kent I fear I am extremely sceptical ; though it must be admitted that the recovery of a Willow Wren at Spurn, which had been ringed on the Isle of May, suggests that it was following such a route and had not gone inland up the Firth of Forth or the Tees estuary.

The Union's Bird Observatory at Spurn seems to me to be ideally situated for studies of this problem. As you are aware, the east coast of Spurn Point at first runs somewhat east of south in the same direction as the coastline to the north and then gradually bends round to the west of south. I have myself watched a number of Sparrowhawks and Kestrels leave the coast at the point where it begins to curve and strike out across the sea in the direction of the east Lincolnshire coast which trends in the same direction. These birds would presumably follow the coastline as far as the Wash.

But many birds continue to follow Spurn Point right down to the Head and if these cross the Humber in a south-westerly direction they may then fly straight

on inland over the low Lincolnshire coast or perhaps turn north-west to follow the Lincolnshire coast of the Humber. It is of interest to note that among birds ringed at Spurn in autumn three have been recovered near Grimsby in the following winter—a Blackbird, a Song Thrush and a Robin, whilst one Robin reached the vicinity of Bristol. These early results hold out promise of many interesting records to come. When some future President addresses the Union on migration he should have many more facts with which to confirm or confute the somewhat speculative views I have put before you.

BOOK REVIEW

British Birds in their Haunts, by **the late Rev. C. A. Johns,** Edited and revised by **W. B. Alexander.** Pp. 282 with 69 plates (64 in colour). 25th edition. Routledge and Kegan Paul, 16/-.

It is pleasant to welcome this new, attractive and, for our days, cheap edition of a book that is so rightly popular as Johns' *British Birds in their Haunts*. This edition—the twenty-fifth—has been entrusted to Mr. W. B. Alexander, who is admirably suited to his task on account of his wide knowledge of ornithological literature, his experience as a field naturalist and his evident affection for the book in question. It will be very useful to those who wish to learn how to identify birds, but the ' expert,' as well as the beginner, must enjoy Johns' delightful prose style and his vivid powers of description : his account, for example, of the Tree Creeper could not be bettered : ' Half-way up the trunk of a rugged elm or oak he (the watcher) will observe a small portion of bark, as it were, in motion ; the motion, and not the colour, betrays the presence of a small brown bird, which is working its way by a succession of starts up the trunk '—and so on.

This edition includes all species of bird which are of regular occurrence in the British Isles ; some species included by Johns have been omitted on account of their rarity. We thus miss, for example, Johns' magnificent opening sentence : ' In order to watch the Vulture in its haunts, we must quit the shores of Britain and repair to warmer countries, which, owing to the rapid decomposition of carrion, the providence of God has stocked with carnivorous animals of great voracity.'

It is unfortunately not made clear that this edition does not include all the species on the British list and a list of those stragglers which have been omitted might perhaps have replaced the Glossary of Provincial Bird-Names. Nor is it clear on what principle rarities have been left out or put in ; we will find here, for example, the Spotted Eagle, Collared Pratincole and Cream-coloured Courser, while the Snowy Owl, Black-winged Stilt and Richard's Pipit are absent. It is probable that the former have been included in the text because they happen to be included in the illustrations.

Two hundred and fifty-one birds have been depicted by William Foster in colour and 18 by Roland Green in black and white : the pictures are both pleasing and accurate, save that several species of Petrel and Shearwater are shown standing upright. It would be nice to see a reprint of Wolf's excellent engravings to the early editions, but it cannot be denied that coloured plates are more popular and more useful for identification.

A welcome innovation among British bird books is that Mr. Alexander has abandoned the traditional British system of classification used by Hartert and *The Handbook of British Birds* and has adopted that of Gadow and Wetmore, beginning with the more primitive species, thus bringing the book into line with bird books in America, the British Empire and other parts of the world.

Mr. Alexander is to be congratulated on a fine piece of editorship and the publishers on a fine piece of book production.

M. F. M. M.

A hitherto unpublished print by Peter Scott entitled ' Moonlight Flight—White-fronted Geese,' has been selected by the Severn Wild-fowl Trust for reproduction on their calendar for 1949. The mounted picture makes an ideal subject for framing when its usefulness as a calendar is obsolete. It is priced at 9/7, including purchase tax, and published by Country Life Ltd., 2-10 Tavistock Street, Covent Garden, London, W.C.2.

THE STUDY OF BRITISH PLANTS

R. D'O. GOOD, M.A., F.L.S.

One often hears deplored to-day the gradual disappearance of the old-time field naturalists who, often in the face of heavy industrial or commercial ties, devoted themselves to the study of some branch of biology in which they not infrequently became widely known authorities, and certainly their numbers are sadly diminished, so that the local natural history societies, of which they were often the backbone, find it increasingly difficult to carry on in the old way. All kinds of explanations have been given for this but it is fairly safe to regard the alteration as more apparent than real. It is unlikely that the proportion of the population possessing a bent for biology is less than it used to be and the change is probably due more to the increased opportunities of the modern educational system than to anything else. In the old days the opportunities of scientific training and employment were small and the natural biologist had to make his own, independent of his bread and butter calling. To-day the potential biologist has a better chance of entering the scientific world and of making his hobby also his profession. The naturalists of to-day are therefore professional rather than leisure naturalists and, rather paradoxically, do not, therefore, strike the attention in quite the same way. Moreover, modern education has given everyone some acquaintance with scientific progress so that here again the amateur is less conspicuous. In short it is biology itself and the approaches to it that have changed. On the one hand the development of biology has made most of its branches more complicated and difficult, while on the other hand a much higher proportion of the population is educationally fitted to take at any rate a mild interest in them. There is thus still the need for the tools of natural history, but they must be rather different tools.

The New Naturalist series of volumes published by Collins is a noteworthy attempt to provide these more modern aids, and the latest of these books to appear, *British Plant Life** by Dr. W. B. Turrill, Keeper of the Herbarium at Kew, since it touches here or there on almost every aspect of our native vegetation except the purely systematic, is likely to be one of the most widely-read of the series. And rightly, too, for it is a very competent book, so packed with information of almost every sort that it will be nearly indispensable, at least as a reference book, to all British botanists. Moreover the author has dealt very satisfactorily with what was obviously his major problem of ' what to put in and what to leave out ' and has made the necessarily somewhat arbitrary decisions on this as unobtrusive as possible. It would be idle to deny that many people will find parts of the book rather heavy going but Dr. Turrill has properly resisted the temptation towards over-simplification.

He begins with a short introduction and then traces the gradual development of the vegetation of these islands from the dim past when life first appeared on the earth, through the ages, to the present day. Particular attention is paid to the Ice Ages and to the various changes in conditions which have occurred subsequently. The British flora is then analysed ; its geographical relationships and the habitat factors which control it are discussed ; and a description is given of the present plant communities in it. The evolutionary aspects of the subject are then dealt with in three chapters on variation, adaptation and natural selection, and heredity, and the book concludes with an account of the continuing changes in British plant life and wi'h a final review. There are also several appendices on special topics, a bibliography, a glossary and an index.

In many ways the more comprehensive a book is the easier it is to criticise it, but there are three matters which strike the present writer as liable to well-founded criticism, one being the concern mainly of the author, one concerning both the author and the editorial board, and one really concerning only the editorial board.

The first is the treatment of the subject of adaptation in Chapter 11. The consciousness of difficulty in the author's mind in presenting this most troublesome subject is clearly shown by the cautious opening of the chapter, but this, frankly, is not very convincing. The concept of adaptation, together indeed with the word itself, is a *damnosa hereditas* from Darwinian days, and it is bad science to

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* **British Plant Life** by **W. B. Turrill.** New Naturalist Series, Vol. 10, Pp. 315 with 53 colour and 27 monochrome photographs, 8 maps and 2 diagrams. Collins, 21/-.

attempt to prolong its currency by attaching to it a meaning which does not properly belong to it. At the time of the publication of the first volume of the *Oxford English Dictionary* in 1888 adaptation in biology was defined as ' a special instance of adapting ; and hence, *concr.* an adapted form or copy, a reproduction of anything modified to suit new uses ' and the first use of the word in this way is attributed to Darwin in the third edition of the *Origin of Species* in the words, ' We see beautiful adaptations everywhere and in every part of the organic world.' Only in the supplementary volume of the Dictionary is there added the additional definition ' an organic modification by which an animal or plant becomes adapted to its environment,' based on a publication of 1892. The point is that, in the right and original uses of the word and its variants, the idea of purpose is generally understood and to use it or them in any other sense is unfortunate.

The failure to break clean away from tradition in this matter is a pity because it makes one doubt whether the account given of it is exactly what the author, with his long scientific training, really means, and also because it leads him to illogicalities which are unmerited, as for instance on page 163 where he suggests that the large number of ovules in the ovaries of some entomophilous plants is a measure of the greater certainty of insect pollination, or on page 182 where he is forced to the point of suggesting that the changes by which, in fact, evolution proceeds, are more likely to be disadvantageous than advantageous. In the first case surely it might be argued that the more certain pollination is the *fewer* the ovules required, but in any case the number of ovules per ovary is no direct indication of the reproductive capacity of a species, which depends on many things besides that. In the second case the author's employment of the word adaptation has brought him to the comfortless position of having to assess the advantage value of characters.

But things are not perhaps quite so bad as they seem for there is, on page 246, a paragraph which atones for much that has been commented on above, and which, if the reader has eyes to see, illumines the whole discussion on evolution. Here the author says, ' The thoughtful naturalist, however, sometimes wonders whether there is not some agency or mechanism, besides natural selection, which in the long run directs evolution along some limited lines. It is possible that the chemical and physical constitution of the chromosomes and cytoplasm determine that certain mutational changes shall occur in such sequence that characters are produced in an orthogenetic (straight line) series.' Here is the real scientific penetration.

The second criticism, which concerns both author and editors, is the continued employment of the misleading and archaic system of depicting geographical distribution by filling in on a map the whole of each of the vice-counties in which an animal or plant occurs, and it really is a matter for surprise that a series of works so up-to-date in its general outlook should have adopted it. Since some of the vice-counties have a long axis of about 50 miles the method may depict errors up to this degree of magnitude, and, in relation say to the width of Britain something like a 50 per cent. error, but more important than this the method is liable to give a completely false impression of the organism's ecological relationships. Seeing the map of the Cheddar pink, for instance, many readers will be able to do no more than assume that the distribution limits of this plant exactly follow the boundaries of North Somerset and that it occurs everywhere therein. Similarly with that of *Frankenia*, many readers can hardly be expected to know that in fact this plant does not commonly occur (as the map shows) twenty or more miles from the coast. These are the drawbacks inevitable in the use of the vice-counties in this way but in *British Plant Life* they have been added to by inaccuracies of another kind deriving from unchecked quotations from Druce's *Comital Flora*. Thus, to take what is probably the worst case, *Trollius* is found in the vice-counties Montgomery, Merioneth, Caernarvon, Derby, South-West Yorks., Mid-West Yorks., North-West Yorks., Durham, North Northumberland, South Northumberland, and Westmorland, but none of these is shaded, while it is now generally regarded as absent from one or two vice-counties in which the map depicts it. This considerable inaccuracy is all the more unfortunate since there is a far more accurate vice-county map of this species in Hyde and Wade's *Welsh Flowering Plants* published in 1934.

Finally a comment on the illustrations, which are a special feature of this series of books. In *Chronica Botanica* for last year there is a lightly-written,

but serious essay on ' The Fad as a Factor in Botanical Publication.' A fad has been defined as a ' hobby, whim, custom or amusement followed for a time with exaggerated zeal,' and on this definition we are certainly suffering at the moment from a fad for colour-photography. Indeed the definition is extremely precise. Let me make it clear at once that some of the results, as seen in Dr. Turrill's book, are delightful and valuable, especially those of fruits which have been posed against a suitable background. But in others the effect is far otherwise. Especially is this so in some of the natural habitat pictures like that of *Parnassia*, where what is presumably intended to be running water reminds one more of a copious fungal mycelium and where the few flowers might be those of any one of many white-flowered members of our flora, or in some of the landscapes, *e.g.* Plates 28 and 37, where the present inability of this photography to reproduce faithfully the greens of nature is all too obvious. And all this is the more remarkable since the book is, at the same time, a monument of what good black and white photography can be. Can anyone seriously prefer let us say the coloured Plate 31 to the exquisite black and white Plate XI? In its proper place colour-photography is excellent, but at present its limitations are considerable and these should be realised.

But despite these comments, *British Plant Life* is a major addition to the great literature of the British Flora, and an addition in the fullest sense of the word, which will put many British botanists in the enduring debt of all those who have had a hand in its production. And not least for the way in which it shows, both implicitly and explicitly, that there still is more to be learnt about our common plants than we already know and that almost any series of observations or experiments, provided they are coherently planned, are likely to add usefully to our sum of knowledge.

SPRING FUNGUS FORAY—SHEFFIELD
April 8th to 12th, 1948

W. G. BRAMLEY

Some fifteen members and friends spent a very enjoyable week-end at Sheffield for the Spring Foray. Headquarters were changed at the last moment to the Women's Hostel, where the creature comforts of the party were extremely well looked after. Our thanks are specially due to Dr. T. E. T. Bond for making all the necessary arrangements and to the Professor of Botany and the University authorities for the use of the Botany Department as a workroom.

Friday was devoted to the examination of the Roche Abbey Woods, while Saturday saw the investigation of the Limb Valley. On Sunday some of the members went to Eccleshall Woods, while others worked out some of the material collected.

The writer of this report is greatly indebted to members for lists and especially mentions Messrs. Mason and Hughes, and Mr. J. Webster. Thanks are also due to Miss Wakefield and Dr. Dennis of Kew for generous help in determinations of Basidiomycetes and Discomycetes.

In accordance with recent discussions accession numbers are now given where specimens are deposited in herbaria. Where several collections were gathered only one accession number is given.

E = Eccleshall. L = Limb Valley.
M = Maltby. R = Roche Abbey.

‡ New to Britain.
† Not in Mason and Grainger's *Catalogue of Yorkshire Fungi* for V.C. 63.
* Not in Mason and Grainger.

Accession numbers are those of the Commonwealth Mycological Institute except those prefixed H., which are those of University College, Hull.

BASIDIOMYCETES

**Corticium tuberculatum* Karst., R. 27648 = *C. lacteum* Boud. & Galz.

Grandinia granulosa (Pers. ex Fr.) Fr., L. 27630.

Peniophora hydnoides C. & M., R.

P. incarnata (Pers. ex Fr.) Cooke, R. 27642.

Radulum orbiculare Fr., L.

Trametes mollis (Sommerf.) Fr., on *Fraxinus*, R. 27640.

Puccinia graminis Pers., on *Agropyron*, R. H 609.

DISCOMYCETES

Calloria fusarioides (Berk.) Fr., Conidial on *Urtica*, M. 27643.

‡*Cistella serrata* (Hoffm. ex Fr.) Quélet, On *Sorbus aucuparia* bark, L. 27624.

‡*Galactinia praetervisa* (Bres.) Bres. ap. Boud., on burnt ground, E. 27713.

Hyaloscypha hyalina (Pers. ex Fr.) Boud., on *Quercus*, L. 27652.

†*Tympanis conspersa* (Fr.) Fr., on *Sorbus*, L. 27718.

PYRENOMYCETES

**Eutype flavovirens* (Pers. ex Fr.) Tul., on *Crataegus*, E. H 551.

Hypomyces aurantius (Pers.) Tul. (stat. con.) R. H 626.

Hypoxylon coccineum Bull., on *Fagus*, L. H 658.

‡*H. serpens* (Pers.) Fr., on *Ulmus* and *Sambucus*, R. H 661.

†*Lasiosphaeria hirsuta* (Fr.) Ces. & de Not., on *Fraxinus*, R. H 624b.

L. ovina (Pers. ex Fr.) Ces. & de Not., on *Ulmus*, R.

L. spermoides (Fr.) Ces. & de Not., M. 27688c.

**L. strigosa* (Alb. and Schw. ex Fr.) Sacc., on *Ulmus*, R. 27693.

Leptosphaeria acuta (Hoffm. ex. Fr.) Karst., on *Urtica*, R. 27635.

**Massarina eburnea* (Tul.) Sacc., on *Fagus*, L. H 534.

**Melanconis modonia* Tul., on *Castanea*, L.

M. stilbostoma (Fr.) Tul., on *Betula*, L. H 622.

**Melanomma subdispersum* (Karst.) Berl. & Vogl., conidia and perithecia on *Betula*, E. 27618a. On *Sorbus*, L. 27639. (Conidial stage=*Helminthosporium longipilum*).

†*Melanopsammella inaequalis* (Grove) v. Hohn., conidial on *Ulmus*, R. 27689 (M. & G. sub. *Gonytrichum caesium*).

Mycosphaerella maculiformis (Pers.) Schroet., on *Castanea* leaves, L.

Nectria coccinea (Pers. ex Fr.) Fr., on *Ulmus*, R.

†*Ophiobolus acuminatus* (Sow. ex Fr.) Duby, on *Carduus*, R.

†*Pseudonectria rousseliana* (Mont.) Seaver, on *Buxus* leaves, R.

**Pseudovalsa acuta* (B. & Br.) Sacc., on *Alnus*, L. H 620.

†*Quaternaria dissepta* (Fr.) Tul., on *Ulmus*, R.

Trichosphaeria myriocarpa (Fr.) Petrak & Lydow (M. & G. *sub. T. minima*), on *Betula* and *Crataegus*, L., E. H 617.

Xylaria hypoxylon (Linn. ex Fr.) Grev., M. 27620.

HYPHOMYCETES

Brachysporium obovatum (Berk.) Sacc., M. 27636.

†*B. tingens* (Cooke) Sacc., R. 27712a.

Clasterosporium abruptum (B. & Br.) Sacc., on *Quercus*, R. 27619c.

**Cylindrodendrum album* Bon., on *Acer*, R. 27645.

**Diplococcium spicatum* Grove, on *Sorbus*, L. 27623.

**Gliocladium album* (Preuss.) Petch, on a Myxomycete, L. 27653.

†*Haplographium bicolor* Grove, on *Sorbus*? L. 27647.

†*H. delicatum* B. & Br., on *Alnus*, L. H 553.

**Helminthosporium rousselianum* Mont., R. 27712d.

**H. simplex* Kunze ex Fr., on *Fagus*, R. 27633.

**H. turbinatum* B. & Br., on *Acer*, R. 27650.

**Menispora caesia* Preuss., on conifer, R. 27610b.

†*M. ciliata* Corda, on *Quercus*, R. 27611. On *Crataegus*, E. H 643.

Monilia aurea auct., R. 27632.

†*Spicaria elegans* (Corda) Harz., on conifer, R. 27610a.

Sporocybe flexuosa (Mass.) Mason, on *Betula*, L. H 640. On *Sorbus*, L. 27638. (=M. & G. *sub. Graphium*).

†*Sporoschisma mirabile* B. & Br., on *Ulmus*, R. 27691. On *Quercus*, R. H 646.

Stachylidium cyclosporium Grove, M. 27649. On *Alnus*, L. H 623.

**Torula cylindrica* Berk., on *Quercus*, R. 27619a.

‡*Trichosporium nigricans* var. *lignicola* Sacc., on *Fraxinus*, M. 27613.

BOOK REVIEWS

The New Naturalist, a Journal of British Natural History edited by **James Fisher** with the assistance of **Elisabeth Ullmann.** Pp. 216, with 12 colour photographs and 175 illustrations in black and white. Collins, 21/-.

The New Naturalist books have already established a position of first-rate importance in the literature dealing with the natural history of the British Isles. This new publication under the editorship of James Fisher and the supervision of the other members of the editorial board of *The New Naturalist* books is complementary to that series. Its ' newness ' lies in the shift of emphasis away from the traditional preoccupation of amateurs with the purely taxonomic and distributional, to the ecological and biological aspects of natural history. Its rôle is to be scientific and not popular though written in a non-academic manner. It will be the editors aim ' to persuade research biologists to write for us the results of their own researches or syntheses of the general conclusions of the biological schools to which they belong, and we will ask them to write their articles at their own level, to explain their work as if they were explaining it to a circle of friends or acquaintances of the same intellectual calibre, but without the special vocabulary of the subject.' The topics dealt with are essentially field study problems to which amateurs can make contributions as valuable as those which they have made in the past to the working out of the flora and fauna of Britain. But although the journal is not addressed to professional biologists, the range of subjects covered and the varied approaches to each are such that they will find material of much interest and value in its pages. When circumstances permit it is intended that this publication shall be issued as a quarterly magazine. For the present it appears as an annual volume made up of four quarterly parts each devoted, as future annual or quarterly issues will be, to a special subject.

The contents of this volume, which is lavishly and beautifully illustrated, deal with Woodlands, The Western Isles of Scotland, Migration, and The Local Naturalist. The quality of the contributions may be judged by the names of the contributors, which include A. G. Tansley, H. Godwin, E. B. Ford, Philip E. Brown, James Fisher, F. Fraser Darling, Peter Scott, R. M. Lockley, C. B. Williams, Brian Vesey-Fitzgerald, J. S. Gilmour and W. H. Pearsall. Space does not permit of our commenting on the individual articles, and it would be invidious to select some for mention to the exclusion of others. But it seems clear that a continued flow of parts equal in standard to this first volume is likely in due course to exert a marked effect on the approach of the amateur naturalist towards his hobby.

Bird Biology for Beginners, by **Brian Vesey-Fitzgerald.** Pp. 178, with 59 drawings by L. R. Brightwell. Cassell & Co., 8/6.

In the last five years a hundred books on British birds have been published. In a recent article on these books James Fisher concludes that half of them are sound and twenty-eight ' almost valueless,' whilst less than half in the category ' Introduction to general ornithology and bird watching,' qualify for inclusion in his ' sound ' class. Concerning the soundness of this volume however there can be no doubt whatever. Mr. Vesey-Fitzgerald combines to a quite unusual degree an ability to match first-rate field knowledge with first-rate exposition. The book covers all the chief topics relating to birds ; origin, anatomy and physiology, song, flight, territory, courtship and display, eggs and nests, the care of the young, the food they eat, where they live, and the facts and problems of migration. The topics are familiar yet the treatment has an admirable freshness and clarity. It is accurate, succinct, direct and wholly devoid of padding. Mr. Brightwell also deserves high praise for the drawings, which add so much to the value and enjoyment of this excellent introduction to ornithology.

Wild Birds and the Land, by **F. Howard Lancum.** Pp. 76. Bulletin No. 140, Ministry of Agriculture and Fisheries. H.M. Stationery Office, 2/6.

This splendidly illustrated book is comprehensive enough to include Owls, Crows, Hawks, Doves, Cuckoo, Thrushes, Tits, Plovers, Nightjar, Corncrake, Wagtails, Flycatchers, Finches, Swallows, Swift, Starling, Woodpeckers and ' miscellaneous birds.' A last chapter deals with ' Nest-Boxes and Bird-Tables.' The facts concerning the few problem species are presented moderately so as to give a balanced view ; but opinions of the merits of such species as Rook and

Bullfinch, Blackbird and Little Owl will still differ according to the holder's experience. The excellent illustrations feature 46 species of bird, photographed in the wild by leading bird-photographers of the day, and alone are well worth the modest price.

R. C.

Mammals in Britain, by **Michael Blackmore.** Pp. 128, with 77 photographic illustrations. Collins 15/-.

Books on birds probably outnumber those on all the other vertebrate animals combined, and by comparison with that group the literature on British mammals is scanty. It is a pleasure therefore to welcome the appearance of this beautifully illustrated volume. No general introduction to the study of our British species of mammals can compare with this for the excellence of its photographs. The names of Eric Hosking, John Markham, Oliver Pike, Frances Pitt and A. R. Thompson, to mention but a few of the photographers who have contributed to this fine series, are a sufficient guarantee of their high quality. The book is good value for the plates alone and with such a galaxy of photographic talent to draw upon Mr. Blackmore may well have feared that his text might suffer by comparison with his illustrations. His account however never fails to sustain the reader's interest. It is designed for the layman and is straightforward and non-technical in treatment. Personal experiences and observations are often drawn upon and whilst he is particularly interesting on the subject of bats (which he was keeping as pets at the age of thirteen), most of the species whose characteristic features and habits are described, have been the subject of patient and independent field study. Mr. Blackmore has in fact produced a notable addition to the literature on British mammals.

Animal Encyclopaedia : Mammals, by **Leo Wender.** English Edition edited by **M. A. C. Hinton.** Pp. 266 with numerous illustrations. George Allen and Unwin, Ltd., 12/6.

Leo Wender worked at the Berlin Zoo and spent over ten years in the preparation of his *Animal Encyclopaedia.* The English edition has been prepared by the Keeper of the Zoological Department at the British Museum (Natural History) and he has rewritten certain sections and added to the information contained in the original. In its present form it is a condensed but comprehensive and illustrated dictionary of all the known species—over 1,500—of mammals. It is designed to give the layman the essential facts about the native countries, habits and characteristics of mammals, but its comprehensiveness will make it equally useful as a handy and inexpensive reference work for the professional zoologist. The arrangement is alphabetical under English names, but the scientific names are given both in the main body of the work and in an appendix of Latin names. Other appendices are devoted to classification and to gestation periods with numbers of young at a birth.

Wonders of Neptune's Kingdom, by **F. Martin Duncan.** Pp. xvi+159, with 34 plates. Sampson Low, Marston & Co., Ltd., 15/-.

There is a fascination about the teeming life of the ocean. It is due partly to the infinite variety of species from the monstrous to the minute and from the beautiful to the bizarre ; and partly to the element of unfamiliarity and mystery which pervades life in the open seas. Such a wealth of material in the hands of an experienced marine biologist could hardly fail to hold the interest and fire the imagination of the least inquisitive. From basking sharks to barnacles, from sperm whales to sponges, from porpoises to plankton and from the mythical mermaid to the mundane mackerel, Mr. Martin Duncan has a fund of interesting information to convey about distributions, habits and life histories. He takes the reader from arctic to tropic seas and from the sunlit surface waters to the eternal blackness of the oceanic depths and does not omit to deal with the life of our own coastal and tidal rock pools. This is, in short, a very interesting introduction to animal life in the sea, written in a simple direct manner, popular but without any tendency to be sensational. Those who have enjoyed the author's other books will find this one no less interesting and enjoyable.

Common British Flowers, by **E. M. Turner**. Pp. 152, with 61 photographs and 2 colour plates. Life and Leisure Series, No. 4. 7/6.

Common British Birds, by **Ralph Whitlock**. Pp. 145, with 86 photographs and 2 colour plates. Life and Leisure Series, No. 8. Paul Elek Ltd., 38 Hatton Garden, London, E.C.1. 7/6.

These are two of the first volumes to be issued in a new series ' which will in time cover every field of contemporary thought and study.' The series is to consist of ' authoritive, well written and pleasantly produced books . . . designed equally for the purer pleasures of reading and for study. All the books in the series are written in a lively and imaginative style, and most of them are profusely illustrated.'

Mr. Ralph Whitlock's book justifies this claim. He knows his birds well and writes about them in an easy unaffected style. He is at once informative and informal, perspicuous yet never prosaic. E. M. Turner's book on flowers suffers by comparison. It has an amateurishness of style which cannot be condoned on the grounds that it is admittedly addressed to the beginner ; nor is the author always well informed let alone ' authoritative.' The Cheddar pink, for example, does *not* grow wild in Yorkshire ; the Squinancywort is very far from being the ' smallest herb in the British flora ' ; it is most improbable that either of the Butterworts which the author found in a Wicklow bog and on the Cheviot hills was *Pinguicula grandiflora* ; and the ' Mountain Cranesbill found, as its name suggests, in high hilly country ' is *Geranium sylvaticum* not *G. pyrenaicum*. There are many more loose statements and half-truths and as it was thought advisable to include a short chapter explaining and justifying the use of Latin names greater care should have been devoted to their proper employment in the text where capital and small initial letters for specific names are used quite indiscriminately. Both volumes are generously illustrated with first-class plates contributed by many of the best-known nature photographers and as extra measure two colour plates are included from Curtis's *Flora Londinensis* and Gould's *Birds of Great Britain*.

Batsford Colour Book. No. 2, Tropical Birds. Pp. 12 with 16 colour plates, after John Gould. Introduction and Notes by Sacheverell Sitwell. **No. 3, Garden Flowers.** Pp. 12 with 16 colour plates, after Jane Loudon. Introduction and Notes by Robert Gathorne-Hardy. B. T. Batsford, Ltd., 6/6 each.

In these books Messrs. Batsford have made available to the ordinary purse first class colour reproductions—they are printed, incidentally, in the Netherlands—of masterpieces of nineteenth-century nature illustration. The volume of birds, with its more robust and varied treatment, is perhaps more successful than the somewhat conventional, though charming, bouquets painted by Mrs. Loudon. The latter book contains an excellent essay by Robert Gathorne-Hardy on flower illustration ; it is a pity, however, that one is not told the names of all the flowers depicted. The introduction to the former book consists of nine pages of pseudo-poetic pot-boiling by Mr. Sitwell, whose ignorance of birds is well matched by the emetic affectations of his prose style.

M. F. M. M.

The Golden Year by **R. M. Lockley**, with drawings by Phyllida Lumsden. Pp. 184. H. F. & G. Witherby Ltd., 10/6.

In his latest book Mr. Lockley describes the daily happenings on his farm throughout the year. Natural history forms a background to his preoccupation with his crops and animals and the weather, his household affairs and family life. But it would hardly be possible for him to write about his everyday experiences without constantly referring to the birds and plants around him, for they are as much an essential part of his life as of his books. There are graphic descriptions of a great thunderstorm and the tragic loss of a flock of sheep swept to their doom over the cliff edge by an avalanche ; and accounts of the occasional halcyon days of spring and summer when work was left behind to sail to the nearby islands and watch the sea-birds or look for newly-born seals. But the commonplace incidents which make up the greater part of the year's experience are enriched in the telling by the author's sensitiveness and sincerity. The aura of the countryside pervades this book as surely as those of Richard Jefferies, and it will as surely delight everyone who loves country life and appreciates good writing.

The Plant in Health and Disease, by **W. A. R. Dillon Weston** and **R. Eric Taylor.** Pp. xii+173 with 60 plates. Crosby Lockwood & Son, Ltd., 21/-.

This book is designed for agriculturists without specialised botanical or mycological training but will also be of interest and value to horticulturists and university students. The authors set out to explain the nature of plant diseases, their methods of dissemination and their prevention and cure. There are short chapters on virus and deficiency diseases but the book is chiefly concerned with fungus parasites of cereals and other farm crops. Fruit crops are not included though a chapter is devoted to diseases of tomatoes. All the diseases of economic importance affecting crop plants grown in this country are included with short accounts of their symptoms, significant points in the structure or life history of the causative agent and the most effective control measures. Information is also included about legislation affecting diseased plants and sources of technical advice, and a very useful classified list of diseases is given in an appendix. The numerous photographs illustrating infected host plants and the fungi responsible are well chosen and admirably reproduced. This is a very useful addition to the publisher's agricultural and horticultural series.

Some Welsh Fungi : a Guide to the Collection of Models in the Department of Botany, by **Eveline A. Jenkins.** Pp. 50, with 52 figs. National Museum of Wales, Cardiff, 2/6.

The models of fungi on exhibition in the Systematic Gallery of the National Museum of Wales are the work of Miss Jenkins who has now described and figured the species represented. Fifty-two of the larger and commoner species are included in the guide with notes on their occurrence and edible or poisonous properties. The figures are clear and well represent the characteristic habits of the species portrayed while the additional information given in the catalogue will considerably increase the educational value of the exhibit.

The Hunting Wasp, by **John Crompton.** Pp. 255. Collins, 10/6.

Many years ago the life histories of the solitary or hunting wasps engaged the attention of Jean Fabre and the Peckhams, and their brilliant and classical investigations left little to be added to our knowledge of these remarkable insects. Mr. Crompton, however, is not one to be daunted by reputations. It is enough that he shares the enthusiasm of his celebrated predecessors, and though he admits at the outset that he has learnt nothing new, he is himself a careful observer who, both at home and abroad, has patiently watched these insects in the pursuit of their prey and the preparations they make for the welfare of their offspring. The story is so full of interest that it is in any case well worth retelling; and doubly so by Mr. Crompton's pen, for he is an excellent *raconteur* with a vigorous and racy if sometimes over-slangy style. His descriptions are both vivid and entertaining, and they cannot fail to enthral anyone unacquainted with the strange habits of these insects ; and in spite of his flagrant anthropomorphism the initiated must be very straight-laced not to warm to his graphic writing. At times the author's exuberance leads him astray. It was not the British Government which offered £10 reward for every Colorado beetle caught in this country, nor was the British Association responsible for the species definition given on page 243. On the provocative subject of instinct *versus* intelligence he does not hesitate to cross swords with Fabre and others in vigorously championing the heterodox view that intelligence plays no small part in insect behaviour. But there is no doubt that Mr. Crompton knows his subject or that his knowledge is well matched by his skill as a writer.

The Course of Nature through the year from the pages of *The Times.* Pp. 336 with five colour plates. Hodder and Stoughton, 10/6.

Early in 1940 Mr. W. Kay Robinson began a series of nature articles which appeared twice weekly in *The Times.* The present volume consists of extracts from these articles selected and arranged by the author whose name, however, does not appear on the title page or cover of the book. About 20 brief articles on seasonable topics are arranged under each month of the year with birds figuring most prominently. With no consecutive theme other than seasonal changes but

always with something relevant to the moment, this pleasantly written miscellany of nature notes is designed for dipping into during brief periods of spare time rather than consecutive reading.

The Year's Photography, 1948-1949. The Illustrated Review of the Pictorial, Nature, Record and Lantern Slide Sections of the Ninety-third Annual Exhibition of the Royal Photographic Society. From the Royal Photographic Society, 16 Princes Gate, London, S.W.7, or from photographic dealers or booksellers. Price 6/- in paper, 8/6 in cloth.

This illustrated review of the year's best pictures contains 42 plates and three articles covering sectional entries in the Annual Exhibition. W. R. Kay discusses 'Pictorial Photography,' Oliver G. Pike writes on 'Nature Photography' and Anne Jackson comments on 'Lantern Slides.' The natural history photographs selected for reproduction include a fine shot of a pair of Nuthatches near their nesting hole and two very fine high-speed flash photographs by Ronald Thompson of the Tawny Owl and Robin in flight, both displaying remarkable detail. The three flower photographs reproduced are of Tulips, Snowdrops and an exquisite study of Tutsan. The portraits, landscapes, still life and other plates are all as artistically satisfying as they are technically perfect.

A Walk down the Lane and what you see. Pp. 53, 3/6. **A Walk in the Woods and what you see.** Pp. 49, 3/6. **A Walk o'er the Downs and what you see.** Pp. 45, 3/6. **A Walk by the River and what you see.** Pp. 45, 3/6. By **Ernest Arris,** with illustrations by the author. The Fountain Press, 46-47 Chancery Lane, London, W.C.2.

Recipe : Take one handful of natural history and one handful of prattle, mix thoroughly, stirring in a few anecdotes, and spicing with sentiment and a pinch of poetry to taste ; half bake, decorate with drawings and serve up in daintily-designed covers. But who—oh ! who—swallows this confection and really enjoys it ? The decorations are the best part of the cake ; not that the texture is stodgy, on the contrary it is altogether too light and puffy. But then the cook only set out to give 'rudimentary' nourishment.

But seriously Mr. Arris is a competent artist, a passable lepidopterist and ornithologist, a feeble botanist, and a slap-dash writer. It was not Hornwort ('note the great thick fingers of brown moss') which was first introduced into the River Cam in 1848 and spread so spectacularly, nor does Eelgrass grow in inland rivers, or Willow Herb produce 'seed pods with long silken parachutes.' And why choose Sundew and Cotton Grass as the only two herbs other than Foxglove—which produces a poisonous alkaloid 'Digitation' !—to receive mention in the walk through the woods ? There is plenty more of this kind of thing, but after all the author only set out to 'impart a rudimentary knowledge.' Rudimentary is the word.

World of Living Things : a Biology for Juniors, by **Kenneth Sparrow.** Pp. 130, with 70 photographic illustrations. Vawser & Wiles, 7/6.

So many introductions to biology are now available, many of them sound and reasonably priced, that the addition of yet another to their number can only be justified on the grounds of superior quality, originality of presentation or freshness of outlook. We can discover no justification for this book. It fails to fulfil any of these requirements and in spite of an all too obvious effort to be bright and interesting it succeeds only in being flat and conventional. The photographs by Bastin are much the best part of the book but it is still very dear at the price.

Moths and Memories, by **P. B. M. Allan.** Pp. 316. Watkins & Doncaster, 36 Strand, London, W.C.2, 8/6.

The standard set by Mr. Allan in his previous books is amply maintained. The author exploits, with all his customary wit and humour, such varied topics as 'Birch and Millers, Wales and Moths ; Beer and Skittles, and Ghosts and Cossus,' and produces most pleasurable reading. No entomologist or general naturalist can fail to be interested and amused by reading this book.

E. D.

RECORDS

***Pallavicinia Lyellii* (Hook.) Gray, an Hepatic new to V.C. 64.** One of the rare events that brightens up the efforts of the worker constantly coming across the same plants has happened at Austwick. In October, 1948, Miss K. Mattinson while visiting Austwick Moss noticed in a very wet area a *Pellia*-like growth that appeared to be slightly different from the usual *Pellia* appearance. On closer examination the arrangement and appearance of the antheridia separated it from that genus and suggested either a *Moerckia* or a *Pallavicinia*. Fortunately in the vegetative phase these can be distinguished by the presence of one strand of lignified tissue in the thallus of the latter, and sections revealed its presence. We have only one British species of this genus and its known distribution is mainly in the South of England, Wales and Ireland. Westmorland is the most northerly county and we have two previous Yorkshire records, Winch Bridge (65), 1843, and Saltersgate Beck (62), 1875. Dr. E. W. Jones has kindly certified the record.—H. Walsh.

***Tilletia* (?) *sphagni* Nawaschin.** Since the report of the discovery of *T. sphagni* Nawaschin on *Sphagnum papillosum* Lindb. from the Lake District (Walker, *The Naturalist*, 1948: 153), capsules of *Sphagnum acutifolium* Ehrh. from the Bradfield district near Sheffield, collected by Dr. V. M. Conway of The Botany Department, Sheffield University, have been found to be infested with this smut. Although these are the only available records of this fungus in Britain to-day, they suggest that the smut is quite common, a fact to be expected from the widespread occurrence of its spores in peat deposits.—D. Walker.

CORRESPONDENCE

To the Editor of 'The Naturalist.'

Dear Sir,

Re Sight Record of Common Kite, *Milvus m. milvus*, on Holy Island, Northumberland, May 15th, 1947.

In your last issue, Mr. M. F. M. Meiklejohn threw doubt on the reliability of this record on the ground that the observer, Mr. R. Henderson, had not proved that he was sufficiently familiar with the species to be able to identify it with certainty. Mr. Henderson now writes :

> 'The Kite seen by me on Holy Island was, without doubt, a Common Red Kite and not a Black Kite. I have seen both species in the Mediterranean. During the war I was "based" at Bougie in Algeria and saw quite a few Red Kites. I have also seen the Red Kite in the south of France when at Toulon and once I saw one take a fish from the water but did not know whether the fish was dead or alive. I saw at least half a dozen Red Kites when stationed at Milford Haven in 1941, getting quite close to one eating a chicken on the rocks. These birds were the very same colour as the bird seen on Holy Island which was of a general rufous colour with a blackish dark patch on the white under-side of the wing noticeable in flight (a patch not seen in the Black Kite) ; head and neck whitish-grey striped with dark ; primaries blackish ; tail reddish-brown very forked.
>
> 'I saw quite a few Black Kites in the south of France. They are quite a different bird altogether appearing darker in plumage and with much less deeply forked tail.'

I think that the above proves that Mr. Henderson is well qualified by experience to be able to distinguish between the two species, and as he saw the Holy Island bird at close quarters on the ground and again in flight he had every opportunity for noting all the distinguishing features. I regret that this information was not given in the original record of the Report.

Yours, etc.,

G. W. Temperley,
Compiler 'Ornithological Report for Northumberland and Durham for 1947.'

THE YORKSHIRE NATURALISTS' UNION EIGHTY-SEVENTH ANNUAL REPORT

(Presented at Scarborough on Saturday, December 4th, 1948)

The Eighty-sixth Annual Meeting was held in the Tolson Memorial Museum, Huddersfield, on Saturday, December 6th, 1947, on the invitation of the Ravensknowle Committee of the Huddersfield Corporation and the Huddersfield Naturalist, Photographic and Antiquarian Society. The Annual Report for 1947 was presented there and is printed in *The Naturalist*, 1948, pp. 21-40.

The Presidential Address, 'A Geological View of the Projected National Parks,' was given by the President, Prof. W. G. Fearnsides, M.A., F.R.S., F.G.S.

The Presidency for 1949 has been offered to and accepted by Miss Lorna I. Scott, M.Sc., F.L.S., of Leeds University.

The Excursions for 1949 will be held at :

V.C. 61. Brantingham Dale, July 30th.
V.C. 62. Strensall. July 9th.
V.C. 63. Worsborough Reservoir, May 21st.
V.C. 64. Harrogate, June 4th-6th.
V.C. 65. East Witton, June 18th.
Fungus Foray. Hull, April, 8th-11th ; Austwick, September 23rd.-27th.
Bryological Section. Plumpton Rocks, April 20th ;
Pateley Bridge, September 10th.

New Members :

F. R. Allison, 10 St. Chads Drive, Leeds 6.
A. S. Allwood, Station Hotel, Whitley Bridge, Goole.
I. Appleyard, Manor House, Linton-on-Wharfe, Wetherby.
A. Beaumont, Mr. and Mrs., Ministry of Agriculture, Quarry Dene, Leeds 6.
T. D. Bisiker, 7 Stanwell Avenue, Huddersfield.
J. Brown, 16 Stafford Road, Sheffield 2.
H. E. Bunker, 18 Abingdon Drive, Ashton, Preston.
Major F. G. Caldwell, R.E., The Gables, Bar Lane, Stanley, Wakefield.
D. E. Caulton, 13 Woodside, Harrogate.
J. Cudworth, 17a Prospect Road, Ossett.
P. E. Davis, Croyde, Layton Road, Horsforth, Leeds.
F. W. Dibb, 31 Iffley Road, Oxford.
E. Dunning, Brockadale House, Wentbridge, Pontefract.
P. F. Garthwaite, M.B.O.U., High Dalby House, Thornton-le-Dale.
P. L. Gravett, 67 East Ella Drive, Hull.
F. N. Hepper, 13 Weetwood Crescent, Leeds 6.
N. M. Hepworth, G.P.O., Thirsk.
P. F. Holmes, M.A., Malham Tarn Field Centre, Settle.
H. E. Jackson, 5 Parliament Street, Hull.
C. A. Mitchell, 2 Scout View, Hall Bank Lane, Mytholmroyd.
A. Morrison, 41 Ranby Road, Sheffield 11.
J. H. Murgatroyd, F.Z.S., F.R.M.S., Strathaird, Broadway, Bramhall, Ches.
Miss D. W. Owen, 62 Whitcliffe Road, Cleckheaton.
Sir M. Palairet, K.C.M.G., and Lady Palairet, Ganthorpe Hall, Terrington, York.
H. Pease, 20 Southdene Terrace, Filey.
G. E. Pringle, Ph.D., The University, Leeds 2.
Mrs. D. Smithes, B.A., 33 Dudwell Lane, Halifax.
J. G. Spittle, 44 Aldin Avenue, Slough, Bucks.
W. A. Thwaites, Silver Street, Masham, Ripon.
Major R. L. D. Weber, The Grange, Winterbourne Abbas, Dorchester, Dorset.
A. H. White, Briar House, Fulford Road, York.
Mrs. E. M. Wells, 4 Chellow Terrace, Chellow Dene, Bradford, Yorks.
Batley Nat. Hist. Sec. (H. Hodgson, 7 Hampson St., Batley).
Harrogate and Dist. Nat. and Sc. Soc. (D. M. Jesper, 23 Woodlands Grove, Harrogate).

The following have ceased membership :

A. G. Beaumont, of Wakefield.
A. D. Bateman, of Sutton-in-Craven.
J. A. Butterfield, of Frizinghall.
D. Mills, of Harrogate.
Miss C. M. McQuillin, of Skipton.
E. E. Naylor, of Bilton.

Miss A. Bradley, of Harden.
Lt.-Gen. Sir A. F. P. Christison, of Edinburgh.
L. F. Gates, of Thornton Heath.
J. Edelsten, of Harrogate.
Capt. Crosby Fox, of Cottingham.
Miss K. Parkinson, of Garforth.
G. B. Reynolds, of Hull.
G. E. Rankin, of Northallerton.
E. A. Smith, of Beverley.
A. H. Taylor, of Leeds.
T. R. Tyson, of Bramhope.

Deaths :

H. Dibb, of Shipley.
H. Oxley, of Leeds.
Prof. F. O. Bower, of Ripon.

Changes of Address :

Abercrombie, R. G., Rutland Hotel, Glossop Road, Sheffield, 10.
Andrews, Miss M., C/o Municipal Training College, Hull.
Burstall, E. B., Cliffe Lodge, Hotham, York.
Burton, W. G., Pontesbright, Babraham Road, Cambridge.
Brown, C., Rugby Dene, Lucy Hall Drive, Baildon, Yorks.
Brownlow, Lt.-Col., H. G., R.E., H.Q., C.R.E. (Works) South, B.T.E. and M.E.L.F.
Beckerlegge, Rev. J. E., 48 Chapel Street, Penzance.
Cattley, Major R., Goathland Hydro, Goathland, York.
Douglas, E. J., Malham Tarn Field Centre, Settle.
Howe, G. A., Denewood, Chestnut Close, Kingwood, Surrey.
Hyde, Miss M. D., Studley College, Warwickshire.
Medlicott, Capt. W. S., Lake Cottage, Thorpeness, Leiston, Suffolk.
Platt, J., 54 Eldon Road, Cheltenham, Glos.
Parsons, A. G., Radiotheraphy Centre, Redruth Hospital, Cornwall.
Payne, K. G., West Dene, Manor Heath, Copmanthorpe, York.
Ruxton, J. E., 59 Sidansfield Park Road, Alnwick.
Stubbs, F. B., 22 Clifton Drive, Marple, Nr. Stockport, Cheshire.
Thompson, E., 9 Barber Street, Dewsbury.

BIOLOGY

Freshwater Biology (H. Whitehead) : The excursion to Thirsk (May 15th to 17th) presented several features of interest and reports on the algae by Miss L. I. Scott and aquatic invertebrata by H.W. are to be found in *The Naturalist*, 1948 : 159-161, 163-164.

In last year's report (*Naturalist*, 1948: 39) Mr. M. Lovett published the results of experiments made on the control of algal growth in Askern Lake. This work has been continued and we are indebted to Miss F. M. Brown for the account given below.

Reports of heavy mortality of fish in the upper lake of Roundhay Park, Leeds, appeared in the press at the end of July last. Careful investigations made by Mr. Lovett and Miss Brown have brought to light some interesting and unsuspected facts. This Committee is fortunate in being allowed to publish the report on their work.

The Medicinal Leech (*Hirudo medicinalis* L.) in Yorkshire.—The writer (H.W.) knew of only one recorded British locality (New Forest) for the Medicinal Leech when writing an account of the freshwater leeches in *The Naturalist*, 1943, 106-7. Last year F. W. Dowson published a work, *Goathland in History and Folklore*, and on p. 123 is the following statement :

> ' It is worthy of note that the Medicinal Leech, locally known as the " loch " leech, was formerly very common in the marshy Randy Mere. This was previous to the excavations for the Whitby Water Works Company's reservoir about 1884. The leeches still occur in the marshy tract at the south-east end. They were formerly caught by bare-legged waders and afterwards sold to the druggists of those days in Whitby. An octogenarian is still amongst us (1945) who caught leeches in this way.'

It should be noted that no leech in Britain except *Hirudo medicinalis* L. is able to pierce human skin and any other British species would be useless for blood letting.

Two visits were made this year to Randy Mere, the first in April and the second in September. The pools were difficult to get at owing to marshy borders and the leech was not found. If the writer had had the courage of the old leech gatherers and waded in bare-legged perhaps he would have been more successful.

The less common species of Water Louse (*Asellus meridianus* Racovitza) was taken at Randy Mere on both visits.

I am indebted to Mr. J. M. Brown for the identification of 'Water Boatmen' from the Goathland district. *Corixa linnei* Fieb., Randy Mere, 9/4/48, ♂, 3 ♀♀; *C. semistriata* Fieb. (new to V.C. 62), Randy Mere, 9/4/48, ♀, 22/9/48, ♂; *C. sahlbergi* Fieb., Randy Mere, 22/9/48, 2 ♂♂, ♀; *C. wollastoni* D. and S., Goathland, near Golf Links, 22/9/48, 2 ♀♀; *C. nigrolineata* Fieb., Goathland, near Golf Links, 22/9/48, ♀.

An Unusual Case of Fish Mortality (M. Lovett, B.Sc., F.R.I.C., and F. M. Brown, B.Sc.): Following information that large numbers of fish, mainly roach, had died in the upper lake at Roundhay Park, Leeds, during the nights of 30th and 31st July, 1948, an inspection of the lake was made.

Several barrow-loads of dead fish had been removed from the lake, and the number of fish killed was probably several thousand. The whole of the lake, which is only 3 to 4 feet deep, was greenish in colour, due to a profuse growth of algae.

Subsequent microscopical examination showed these to be non-filamentous Chlorophyceae and Cyanophyceae, including *Scenedesmus*, *Ankistrodesmus*, *Tetraëdron*, *Lagerheimia*, *Euglena*, *Chlamydomonas*, and *Aphanocapsa*. The crustacean *Cyclops* was also numerous. There are no large plants in the lake.

Samples of lake water were taken at 12 to 18 in. below the surface at the following points:

1. Near the landing stage.
2. Near the lake outlet.
3. From the middle of the lake.

Determinations of dissolved oxygen were made at the time of sampling. The results, with others, are summarised below, analytical data being expressed as parts per 100,000.

Samples taken at 6 p.m., 5/8/48.	*Sampling Point No.* 1.	2.	3.
Oxygen in solution at 65° Fahr.	1·31	1·34	1·34
= Percentage saturation	138%	141%	141%
Total alkalinity in terms of $CaCO_3$	11·5	12·0	11·5
Caustic alkalinity in terms of CaO	1·5	1·4	1·5
*p*H value (electrometric)	9·50	9·54	9·60

There was no evidence of pollution.

The view had been expressed that deficiency of oxygen caused the fish to die, but this seemed very improbable judging from the foregoing results.

It is a well-known fact that algae are able under suitable conditions to utilise free and half-bound (bicarbonate) carbon dioxide. This process of photosynthesis is dependent among other factors on light intensity and temperature. During the exceptionally warm, bright sunny weather preceding the destruction of the fish, this photosynthetic activity would have been at a maximum. In the process, the carbon of the carbon dioxide is converted to carbohydrates and oxygen is liberated.

In the samples examined, no free carbon dioxide remained and the process had been so vigorous as to exhaust the half-bound carbon dioxide, with the formation of caustic alkalinity and consequent increase in the concentration of hydroxyl ions (increase in *p*H value). At the same time, the oxygen liberated was sufficient to cause marked supersaturation.

Since it also happens that, at night, oxygen production by algae ceases, and that decomposition and respiration cause reduction in dissolved oxygen content, further samples were obtained, earlier in the day, on 7th August. Although there had been a significant reduction, the amount of oxygen in solution was still high, and, except near the landing stage, corresponded to approximately 100 per cent. saturation. The results for the same sampling points are given below:

Samples taken at 11 a.m., 7/8/48.	*Sampling Point No.* 1.	2.	3.
Oxygen in solution at 65° Fahr.	0·64	0·97	0·90
= Percentage saturation	67%	102%	94%
Total alkalinity in terms of $CaCO_3$	12·5	12·0	12·0
Caustic alkalinity in terms of CaO	1·4	1·4	1·4
*p*H value (electrometric)	9·45	9·50	9·50

Even having regard to the facts that the investigation was made several days after the fish destruction, by which time the fish population had been greatly reduced or completely destroyed ; that the rate of oxygen consumption by living fish increases with increase in temperature ; and that bottom deposits may have been absorbing dissolved oxygen ; it would appear that the cause of the mortality was not oxygen deficiency.

It is more probable that the fish could not tolerate the caustic alkalinity caused by the photosynthetic activity of the algae. The limiting *p*H value tolerated by fish has often been quoted as 8·5, and it has been stated that fish metabolism is considerably disturbed at *p*H 9·0, while a *p*H of 9·8 causes fatal haemorrhage.

It is possible that, at the time of the fish mortality, the *p*H of the lake water was even greater than the values given in the preceding analyses. An attempt to examine this possibility was made by allowing a sample of lake water to stand in a large beaker, throughout one day in north light (no direct sunlight). At 9 p.m. the sample had a *p*H of 9·85 and a dissolved oxygen content at 70° Fahr. of 1·76 parts per 100,000, corresponding to 196 per cent. saturation. The beaker was then placed in the dark, in an incubator at a temperature of 65° Fahr. for 12 hours. On removal from the incubator, the sample had a *p*H value of 9·48 and a dissolved oxygen content of 0·92 parts per 100,000, corresponding to 97 per cent. saturation.

Information regarding the effect of supersaturation of oxygen on fish is rather conflicting. It has been suggested that supersaturation up to at least 220 per cent. is without effect (1). On the other hand, accounts have been given of supersaturation leading to the formation of oxygen bubbles in highly dispersed form which gave the water a milky appearance, causing cloudiness round the fish which were suffocated, not through lack of oxygen, but because their gills can only utilise dissolved oxygen (2). It is of interest that an observer at Roundhay volunteered the information that he had seen large milky-white patches in the lake ' like that seen when Jeyes Fluid is poured into the water.'

There is also a well authenticated account of fish in Westlake Park, Los Angeles, having been killed by a 300 per cent. supersaturation of oxygen (3). Death was attributed to oxygen bubbles on the gills. The high oxygen content was due, as in the case of the Roundhay Park Lake, to a heavy growth of algae. No reference was given as to the *p*H value.

It would therefore seem probable that the fish in Roundhay Park Lake were killed either by the development of caustic alkalinity (high *p*H) or by the effects of the supersaturation of oxygen, or by a combination of these factors.

With the object of preventing similar cases of fish destruction, both in the Roundhay lake and in other similar lakes, it is suggested that a check be kept on the *p*H and dissolved oxygen content of the water, particularly in late spring and early summer.

If the *p*H reaches, say, 8·0 and shows a tendency to increase still further, the algal population should be checked by the carefully controlled addition of a suitable algicide, *e.g.* copper sulphate.

The investigation was made for the West Riding of Yorkshire Rivers Board, and the authors are indebted to Mr. J. H. Garner, the Board's Chief Inspector, for permission to publish this account.

1. Birge and Juday, *Wisconsin Geol. Nat. Hist. Survey Bull.* 22 (1911).
2. Keim, *Gesundheitsing*, 1940, **63**, 20.
3. *J. Amer. Wat. Wks. Ass.*, 1938, **30**, 1420.

Miss F. M. Brown, B.Sc., has contributed the following, which is published by permission of Mr. J. H. Garner, Chief Inspector, West Riding of Yorkshire Rivers' Board.

Askern Lake.—A single application of copper sulphate to the lake water in April was sufficient to check excessive growths of *Vaucheria*. No damage was caused to fish, and conditions in the lake have been very satisfactory for boating and fishing.

Experiments made in the Board's laboratory on the effects of copper sulphate and sodium arsenite on algae and water plants have shown that *Vaucheria*, *Spirogyra*, *Zygnema*, etc., were killed by 10 parts of copper sulphate (crystals) per million, but that *Elodea*, *Hippuris*, *Myriophyllum* and *Utricularia* were

unaffected. On the other hand, 6 to 10 parts arsenite ($NaAsO_2$) per million destroyed all the plants except *Utricularia*, but had no such effect on algae. In fact the growth of algae and fungi was stimulated. This concentration of arsenic was not toxic to tadpoles or fish. The water used was ' hard ' and had an initial *p*H of 8·1.

Two sticklebacks (from Askern Lake) died after being kept in separate aquaria in the laboratory for 13 and 15 months respectively. Post mortems showed the presence in one of the tape-worm *Triaenophorus nodulosus* (25 cm. × 1 mm.) which had destroyed the gonads and formed a swelling in the body cavity. In the other, *Schistocephalus solidus* larvae were present in fair number in the gonads which were almost completely destroyed. It is unlikely that infection of either stickleback occurred in the laboratory.

Hydra kept in the laboratory and fed on *Lumbricillus*, showed rapid growth and budding—some with three buds at the same time. There was also a tendency for the number of tentacles to increase from 8 to 10 or 12, and one specimen showed a forked tentacle.

Phenological Committee (W. E. L. Wattam): The initial report of this Committee is embodied in the plant chart given below, and is based as far as possible on the form of the phenological yearly return used by the Royal Meteorological Society. Owing to illness which compelled our esteemed recorder (Mr. A. Malins Smith) to resign his office, no guidance was published to enable the requisite work to be taken in hand, consequently contributors to the annual Botanical Report of the Union (from whose reports the chart is based) followed their customary methods. The Committee has decided to adopt for county phenological purposes the system used by the Royal Meteorological Society. To this end co-operation has been sought from the Ornithological and Lepidoptera Committees of the Union. It is hoped to circulate lists and memoranda to those who may be willing to help with observations.

Phenological Observations from Yorkshire Districts, based on the Yearly Return for 1948 as required by the Royal Meteorological Society

Contributors: C. A. Cheetham (Austwick District), R. Lewis (S.E. Yorks. District), A. Malins Smith (Shipley District), Wharfedale Naturalists' Society, per Miss E. A. Brown, Hon. Sec. (Wharfedale District), W. E. L. Wattam (Huddersfield District).

Flowering Plants	Cheetham	Lewis	Smith	Brown	Wattam
Corylus Avellana L.	Feb. 12			Feb. 15	Feb. 17
Tussilago Farfara L.	Feb. 12	March	Mar. 3	Feb. 24	Feb. 17
Ranunculus Ficaria L.	Mar. 10	February		Mar. 13	Mar. 18
Scilla non-scripta (L.) Hoff. & L.			Apl. 11		Apl. 10
Anemone nemorosa L.	Mar. 30			Mar. 20	Apl. 3
Cardamine pratensis L.			Apl. 11		May 1
Allium ursinum L.			Apl. 26		May 28
Sisymbrium Alliaria Scop.			Apl. 25		May 10
Aesculus Hippocastanum L.	May 25		May 11		Apl. 10
Crataegus Oxyacantha L.	May 1		May 14		Apl. 10
Chrysanthemum leucanthemum L.					May 28
Rosa canina L.	June 22				June 17
Digitalis purpurea L.					June 17
Calystegia sepium (L.) Br.					July 1
Campanula rotundifolia L.					July 9
Calluna vulgaris (L.) Hull					Aug. 18
Hedera Helix L.					Sept. 11
Leafing of Trees					
Fagus sylvatica L.					Apl. 26
Quercus Robur L.	May 1			May 3	Apl. 26
Fraxinus excelsior L.	May 22			June 14	May 12
Aesculus Hippocastanum L.					Apl. 10

ZOOLOGY

Mammals, Reptiles, Amphibians and Fishes

Mammalia (Mrs. A. Hazelwood): CHIROPTERA.—Pipistrelle Bats were first seen near Newsome (Huddersfield) on June 8th and they are recorded from Midgehole (Hebden Bridge) on April 12th and July 4th as well as from Lee Mill (Hebden Bridge) on April 15th.

The Noctule colony near York is increasing in numbers and it is possible to see up to four at once hawking over the River Ouse.

INSECTIVORA.—Seven living and two dead Hedgehogs have been seen at Newsome, the latter in an ornamental fishpond. This year only four dead were found, killed by vehicles along the stretch of road between Glusburn and Keighley. Two Moles were trapped on April 8th at Midgehole; the female contained five embryos.

Water Shrews were recorded at Nutclough Dam, near Hebden Bridge, for the first time on April 11th. At Middle Dene they were found feeding on caddis fly larvae on April 16th, and towards the end of May at Lee Mill Dam they were seen to be carrying nesting material; one female caught and worried a black slug and carried it away.

RODENTIA.—The colony of Water Voles at Lee Mill Dam are reduced in numbers this year, but subsidiary colonies have been formed nearby. On April 7th the canal near Magroyd burst and in a few days the Water Voles left the locality to return fourteen days after the damage had been made good. On June 12th juvenile Water Voles were seen at Lee Mill and on June 25th one was seen to chase away a Common Shrew from the bank side to which it persisted in returning.

In June a farmer near Hebden Bridge caught a Field Vole, pure white except for a few dark hairs on its haunches. Its eyes were black.

Dreys of Red Squirrel were located, chiefly in Larch, at Hardcastle Crags, where there was evidence of recent activity. Mr. Garnett has heard of a Red Squirrel in the forest near Thornton-le-Dale, though he has not himself seen one in eleven years. Mr. Chislett considers that Grey Squirrels have been less numerous around Masham since the frost of 1947, but there are still a few about. Grey Squirrels have been again reported from Priest's Bank (Kildwick), Farnhill Woods, Ravenstones Wood (Sutton-in-Craven) and near the corn mill at Glusburn. They are now comparatively uncommon around York, not having recovered from the hard winter of 1946-47. A Grey Squirrel was shot at Hardcastle Crags on January 22nd and one has been seen subsequently.

Rabbits are reported to have had a good season around Hull, where they are in good numbers, as are Common Hares.

CARNIVORA.—Badgers and Otters are reported to be in their usual numbers in the Helmsley area. An aged dog Fox weighing 18 lb. was shot at Blackmoorfoot, near Huddersfield, on September 9th. Its muzzle was almost white and some teeth were broken. Foxes seem to have maintained their increased numbers everywhere. In the Hebden Bridge area prior to 1945 only about nine Foxes had been shot; in 1945, 16; in 1946, 23; in 1947, 54; and up to mid-June, 1948, 38 have been accounted for. Mr. Sam Bancroft, a 73-year-old gamekeeper on Haworth Moor stated that up to 15 years ago he had killed only twelve Foxes and that the oldest gamekeeper on the moor could hardly remember having seen a Fox, but that in the first six months of this year Mr. Bancroft had already killed 50.

A Common Seal was seen at Spurn on three occasions by Mr. Procter, and Mr. Ainsworth reports them as numerous during August and early September. A young one was captured near Bridlington.

Some reduction seems to have been effected in the numbers of Stoats and Weasels in the East Riding, where they had increased noticeably during the war years.

CETACEA.—Porpoises were seen off Spurn and a Common Dolphin was washed up dead early in September.

Reptilia (Mrs. A. Hazelwood): Several Common Lizards have been seen at Kilnsea Warren and above Masham and a Slow-worm was seen on May 15th between Sutton-under-Whitestone Cliff and Thirlby. Two Slow-worms are also recorded from Darnholme, Goathland, basking on a grassy bank near heather and bracken about 3 p.m. on September 24th.

Grass Snakes are again reported from the Hull area. During the last week of August a boy took home a Grass Snake which he had caught near Hull, and the following morning he found it had deposited ' a lot of eggs' in its hutch. An Adder was seen on the Masham moors on July 22nd and two are reported as having been seen basking near the above-mentioned Slow-worms on September 24th.

Amphibia (Mrs. A. Hazelwood) : Great Crested and Smooth Newts were seen on May 19th at the Brick End Ponds, West Bretton.

Frog spawn was first seen in the Hebden Bridge district on March 7th. At Newsome, near Huddersfield, the first Frog spawn was seen on February 19th and Tadpoles at the same pond on March 26th. Young Toads were common amongst the vegetation of the overflow ponds bordering the lake in Cannon Hall Park, Cawthorne, as well as young Frogs, on August 25th.

Pisces (Mrs. A. Hazelwood) : It is reported that there are very considerable numbers of Grayling in the upper reaches of the River Ure. Near Hull an unusual number of Barbel have been caught. At Ferriby Sluice one afternoon early in September a fisherman caught 14 lb. 3 oz. of fish, 9 lb. of which were accounted for by three bream.

On August 9th the North Sea trawler, *Arctic Humber*, brought into Hull a Sun-fish weighing 12 st. 10 lb. ; it measured 5 ft. long, 4 ft. deep, and 8½ in. thick.

The following incidents took place at Drax Abbey, near Selby, where some large Pike inhabit the moat. Some Swallows were dipping into the water, almost always at the same place, but as they did not continue their flight the fisherman went for a closer look and actually saw the Pike swimming just below the surface and at the moment at which the Swallows touched the surface of the water the Pike pulled them down.

There is a new Trout and Salmon hatchery now working at Costa Farm, Pickering. There has been a Trout-rearing farm at Pickering for a long time, but now the Yorkshire Fishery Board have built a hatching house and dug a lot of ponds and Trout were spawned artificially there last winter for the first time. Salmon ova were also sent there for hatching and 50,000 Salmon parr were turned loose into some of the local streams which drain into the Derwent. The bailiff says these fish will remain for two years in the streams, and then should go to sea where it is possible some few of the survivors might run up the streams the same year—that would be in 1950. This will interest fishermen, for someone might catch one of these and any Salmon caught in the Derwent or its tributaries would presumable be one of these, as Salmon do not run up here at all. Of course, they were much too small to mark when released.

Professor Spaul informs us that the number of parasitised Roach in Thrybergh Reservoir is greatly reduced now owing to netting, but examples of similarly parasitised fish are still being obtained in Denholme Reservoir. Parasitised Sticklebacks are still found in the Leeds district.

The following fish have been introduced into the canal by the Hebden Bridge Angling Club since January, 1948 : 125 Pike, 500 Roach, 750 Perch, and 25 Tench weighing ½ lb. to 4½ lb., all from Welham Park ; also 1,500 Trout.

For valuable assistance in the preparation of the above annual report I am indebted to Messrs. A. Butterfield (Cross Hills Naturalists' Society), H. Whitehead (Leeds), W. E. L. Wattam (Huddersfield), F. Dean (Mytholmroyd), E. W. Taylor (York), G. R. Edwards (Halifax), R. Chislett (Masham), E. A. Spaul (Leeds), C. F. Procter (Hull), Rex Procter (Linton), R. M. Garnett (Thornton-le-Dale), and G. H. Ainsworth (Hull). Also to Mr. R. W. Ward, Clerk to the Board of Conservators, Yorkshire Fishery Board, for his kindness in sending a copy of his eighty-first Annual Report.

ORNITHOLOGY

Interim Report (R. Chislett) : A mild winter, followed by a cool and showery spring and summer, enabled many species of bird, whose numbers had been heavily depleted by the severities of early 1947, to begin the process of recovery.

Outstanding events have been : the occurrence of a Bonaparte's Gull at Swillington Ing in February ; of a Yellow-browed Warbler at Spurn in October ; and the breeding in the county for the first time of a pair of Little Ringed Plovers.

The Committee was represented at all the Field Meetings of the Union, officially at most.

The Spurn Bird Observatory is having a successful year under the able care of its Hon. Secretary (G. H. Ainsworth), to whom the thanks of all are due. The cottage has been occupied almost continuously since April by members and by visiting ornithologists. For ten days in July the Y.N.U. Entomological Section held a field meeting there.

The number of birds ringed in 1948 has kept well in front of the numbers ringed at corresponding dates in 1947. On October 9th, under conditions exceptionally favourable, G. R. Edwards, W. F. Fearnley, and their colleagues, established a new record score for one day of 56 birds ringed.

Recoveries of birds ringed are steadily improving in value, and this year include concrete evidence of coastal migration of a Willow Warbler from the Isle of May to Spurn; of south-westerly migration of a Robin from Spurn to the Severn estuary; and of the Scandinavian origin of a Blackbird at Spurn in November, 1947.

We were represented at meetings of the B.T.O. Observatories Committee at Edinburgh (and the Isle of May) in spring, and at Lundy Island in autumn.

The Wild Birds Protection Acts Sub-Committee has continued quietly with its work, but as yet has been unable to solve the question of damage to the Ternery at Spurn Point by visitors.

With an ornithological President of the Union, the first for nine years, a good attendance is expected at Scarborough for the Annual Meeting on December 4th. Probably no one has visited so many bird observatories so often as Mr. Alexander, and it is understood that 'Bird Observatories' will form the subject of his address.

The detailed Annual Report will be considered at the meeting of the Vertebrate Section to be held on March 12th, 1949. It is requested that notes be sent in to the Recorders in December, with any further notes immediately after December 31st, so that the report can be written, printed, and circulated in proof form in good time before the meeting.

Spurn Bird Observatory Report (G. H. Ainsworth): The Observatory has attracted visitors from all parts of the country and our financial position is satisfactory. Our exports, according to our ringing returns, are to soft currency areas only, but we may have brought dollars into the country as we have had visitors from the United States and South America!

Everyone concerned with the War Department's interest at Spurn has been most helpful, and I would like to express the thanks of my Committee to the D.C.R.E., Major Berry; the Garrison Engineer, Mr. Batchelor; the Lands Agent, Mr. Pottage; the Clerk of Works, Mr. Iveson; and to Major Johnson, the officer in charge of the Spurn defences.

A new coal and wood shed has been erected for us. Two new lavatories have been installed. A new roof has been fixed on the cottage, and casement windows to the living room and to one of the bedrooms.

Permission has been granted to us by the War Department to erect a second trap. This will be at the Point where we find birds gather before and after crossing the Humber. Plans have been submitted to the Garrison Engineer and the C.O. Spurn Defences. We hope to have the trap completed by next spring.

Many of our visitors have sent gifts for the cottage and have said how much they enjoyed their stay, speaking highly of the available facilities. Many botanists and entomologists have again taken advantage of our accommodation at the cottage and have commented highly on the place.

The Nature Reserve and Wild Life Conservation Committee of the Lincolnshire Naturalists' Union sent their representatives to the observatory for a few days with the object of obtaining information and taking photographs so that a similar observatory might be begun at Gibraltar Point on the Wash.

The weather at Spurn throughout practically the whole of September was not favourable to trapping owing to S.W. winds. Nevertheless more birds have been ringed this year than last.

To October 16th, 1947, we had ringed 426 birds. This year to the same date we have ringed 604. These include Nightingale, Barred Warbler, Yellow-browed Warbler, Black Redstart and Willow Tit.

The following is a list of birds ringed up to date this year.

Starlings	33	Wood Warbler	3
Jays	1	Barred Warbler	1
Greenfinch	26	Yellow-browed Warbler	1
Chaffinch	55	Song Thrush	8
Linnet	61	Blackbird	21
Yellow Bunting	6	Robin	13
Reed Bunting	6	Nightingale	1
House Sparrow	26	Hedge Sparrow	8
Great Tit	8	Wren	5
Blue Tit	25	Common Redstart	18
Skylark	2	Black Redstart	1
Meadow Pipit	3	Whinchat	4
Spotted Flycatcher	9	Brambling	4
Pied Flycatcher	26	Redwing	1
Northern Willow Warbler	3	Willow Tit	1
Willow Warbler	90	Cuckoo	4
Common Whitethroat	61	Swallow	18
Lesser Whitethroat	4	Sand Martin	7
Blackcap	1	Goldcrests	9
Garden Warbler	6	Ringed Plover	9
Sedge Warbler	11	Little Tern	4

We have caught in the trap this year a number of Common Whitethroats which were ringed in May or August, 1947.

A Blackbird ringed in November, 1947, was found at Kvaas, Norway, in the spring of this year.

A Starling ringed in May of this year when just out of the nest was found at Saltfleet in June.

A Robin ringed in October, 1947, was found near Bristol on February 29th, 1948.

A Chaffinch ringed in the autumn of 1947 was found at Balerno, Scotland.

A Willow Warbler ringed on the Isle of May in the last week of July, 1948, was caught in our trap a week later. This, I believe, is the first recorded instance of a bird being ringed at one observatory in the British Isles and caught at another.

Many birds caught during the spring passage entered the trap again in the autumn.

Since we started ringing at Spurn the following species have been ringed: Blackbird, Blackcap, Brambling, Bullfinch, Corn Bunting, Reed Bunting, Yellow Bunting, Chaffinch, Chiffchaff, Cuckoo, Pied Flycatcher, Spotted Flycatcher, Red-breasted Flycatcher, Goldcrest, Goldfinch, Greenfinch, Jay, Continental Blue Tit, British Blue Tit, Willow Tit, Great Tit, Barred Warbler, Garden Warbler, Icterine Warbler, Sedge Warbler, Northern Willow Warbler, British Willow Warbler, Wood Warbler, Yellow-browed Warbler, Common Whitethroat, Lesser Whitethroat, Skylark, Common Linnet, Sand Martin, Nightingale, Ring Ousel, Short-eared Owl, Oystercatcher, Meadow Pipit, Tree Pipit, Robin, Mealy Redpoll, Lesser Redpoll, Common Redstart, Black Redstart, Redwing, Hedge Sparrow, Tree Sparrow, Starling, Swallow, Little Tern, Song Thrush, Wheatear, Whinchat, Wren, Wryneck, Sparrow Hawk.

These are birds which have actually been handled, but the observatory has not been established solely for ringing; it is also for watching birds, and it may be of some interest to mention some which have been seen (and in some cases shot before Spurn became a bird sanctuary) either on or close to the peninsula, this will indicate the attraction of Spurn to bird watchers: Desert Wheatear, Stonechat, Red-spotted Bluethroat, Firecrest, Reed-warbler, Grasshopper-warbler, Tree Creeper, White Wagtail, Blue-headed Wagtail, Tawny Pipit, Richard's Pipit, Rock-Pipit, Great Grey Shrike, Red-backed Shrike, Woodchat Shrike, Waxwing, Hawfinch, Siskin, Greenland Redpoll, Twite, Common Crossbill, Two-barred Crossbill, Ortolan Bunting, Rustic Bunting, Snow Bunting, Rose-coloured Pastor, Woodlark, Shorelark, Nightjar, Great Spotted Woodpecker, Barn Owl, Tawny Owl, Little Owl, Short-eared Owl, Tengmalm's Owl, Snowy Owl, Eagle Owl, Marsh Harrier, Hen Harrier, Montagu's Harrier, Common Buzzard, Rough-legged Buzzard, White-tailed Eagle, Goshawk, Peregrine Falcon, Hobby, Merlin, Red-footed Falcon, Osprey, Brent Goose, Pintail, Scaup, Long-tailed

Duck, Eider Duck, Velvet Scoter, Turtle Dove, Pallas's Sand Grouse, Corn Crake, Little Crake, Water Rail, Demoiselle Crane, Little Bustard, Macqueen's Bustard, Dotterel, Avocet, Black-winged Stilt, Red-necked Phalarope, Pectoral Sandpiper, Little Stint, Ruff, Wood Sandpiper, Green Sandpiper, Spotted Redshank, Greenshank, Black Tern, Little Gull, Great Skua, Arctic Skua, Pomatorhine Skua, Stormy Petrel, Manx Shearwater, Glaucous Gull.

Thus I feel that the enthusiasm and backing which enabled us to start the observatory and ringing station at Spurn is fully justified.

There is still work to be done. The huts around the cottage are now down and we wish to plant the area with shrubs and trees as soon as the huts are removed and we have fixed up a fence. So we would be grateful if our visitors would bring along rooted cuttings and shrubs to form cover, whenever they can, as there is a large area to plant.

My Committee would like to thank all our visitors for the way they have supported the work in leaving the cottage clean and tidy for those who came after them ; for renewing breakages and for taking care not to break down any shrubs and bushes during the enthusiasm of bird catching.

The work of making Spurn Observatory a success has only just begun. It will require the support of all Y.N.U. members to make it the observatory of which you can be proud.

I wish to thank my Committee for their unfailing support and assistance throughout another year. (G.H.A.).

CONCHOLOGY

(Mrs. E. M. Morehouse) : I have to thank the faithful few for submitting the following records :

Mr. J. H. Lumb reports that the water from the Calder and Hebble Canal has been drained off between Halifax and Salterhebble, a distance of about a mile, with the result that many molluscs, including *Anodonta cygnaea* which has been known to occur here for over 100 years, have now ceased to exist. *Paludestrina jenkinsi* Smith was first recorded here and *Vivipara vivipara* L. was always one of the species to be taken as well as some fine *Limnaeas*. Mr. Lumb reports finding two specimens of *Limax maximus* L., measuring just over 7 in. in length.

Mr. C. F. Sweetman's records for last year were received too late for the 1947 report. He remarked that in 1946 *Helicella virgata* Da Costa swarmed on the grass verges of the Tadcaster road, the variety *submaritima* predominating. *H. caperata* Montagu occurred in the same habitat in 1945 but was not to be seen in 1946 or 1947. This year (1948) this habitat was visited by the Yorkshire Conchological Society when *H. virgata* was fairly plentiful.

On September 21st, 1947, Mr. Sweetman found one living and one dead specimen of *Zonitoides excavatus* Bean under a piece of fallen wood in a plantation at Hovingham. On revisiting the habitat with Mr. A. Smith on October 5th no further specimens could be found but *Vitrea radiatula* Alder. was seen. This species, though not rare round York, is very local.

Mr. A. Arnold Wallis reports that *Paludestrina jenkinsi* Smith was seen in the River Derwent at Ganton this year. Its first local record for the Scarborough area was from Folkton in 1946. *Theba cantiana* Mont. is extending its range along the Scalby Road and also between Osgodby and Cayton. One specimen of *Helix hortensis* Müll. var. *citrino-zonata* occurred in Stepney Drive and is believed to be the first local record, but *H. nemoralis* L. and *H. hortensis* Müll. are both much scarcer, many old habitats having been destroyed. *Vivipara contecta* Müll. still flourishes in the pond in Cayton Bay.

The drain at Blaxton, near Doncaster, where the last-named species used regularly to be found is now entirely overgrown with vegetation, and when last visited it could not be found here or in the adjoining drains.

Mr. A. Stanley Cook sends a good record, viz. *Acicula lineata* Drap. from Levitt Hagg limestone quarries near Doncaster. It was found under rotting wood with numerous specimens of *Carychium minimum* Müll., 26 of which were taken. On Lindrick Common both type and varieties of *Helix hortensis* Müll. and *H. nemoralis* L. were found, and a fine specimen of *Arion ater* var. *plumbea* Roebuck was found in the woods adjoining.

On June 12th the Yorkshire Conchological Society and Doncaster Scientific Society had a joint meeting at Broc-o-dale, when 20 species of molluscs and slugs

were taken. Perhaps *Unio tumidus* Retz., found by Miss Morehouse, was the best capture. This and *Anodonta cygnaea* L. were at one time plentiful in the River Went. *Vallonia pulchella* Müll. from the roadside near Tadcaster was the best find when the Yorkshire Conchological Society visited that area.

On August 14th Collingham, Boston Spa and Bramham Cross Roads were visited by five from Doncaster. All the recorded species except *Helicella virgata* Da Costa were found on the road between Aberford and the Cross Roads. *Helix hortensis* Müll. seems to have returned to its original situation on this road. Just before the war it was to be found on the edge of the village. Ten species of molluscs and two slugs were taken, including *Vallonia costata* Müll., which was new to the writer for this area. Fifteen species of molluscs were found at Collingham, where *Pomatia elegans* Müll., which was also found at Boston Spa, was seen in abundance.

ENTOMOLOGY

Mr. Malins Smith has sent the following interesting report on Forest Insects in Bolton Woods by Mr. E. J. Cutmore, of Bolton Abbey :

The area infested by the Larch Shoot Moth last year has made a wonderful recovery. Although not too robust the condition of the Larch is quite satisfactory. This year has been rather a bad one for tree pests. The Spruce gall aphid (*Adelges abietis* (L.)=*viridis* (Ratz.)) has been rather common among seven to ten year old trees. The Larch Shoot Moth (*Argyresthia laevigatella* (H.-S.)) is found chiefly on Larch from ten to twenty years old, and the Larch needles are infested by the moth, *Coleophora laricella* (Hueb.). A number of Elms are infested by the aphid, *Eriosoma ulmi* (L.), a close ally of the American Blight. Douglas Fir has had a bad attack of *Gilletteella* (*Adelges*) *cooleyi* (Gillette). The thorn hedge between the Devonshire Alms and Bolton Abbey has been badly damaged for some half a mile. In fact the growth is now only 2 to 3 in. long whereas normally it should be in the region of 15 to 18 in. The leaves are attached by the gall-mite, *Eriophyes goniothorax* Nal., and the tips of the shoots by the gall-midge, *Dasyneura crataegi* (Winn.).

Coleoptera (Geo. B. Walsh) : Owing to illness, advancing years, and departure from the county, the Coleoptera Committee has lost some of its most hard-working members. Mr. E. W. Aubrook has worked enthusiastically, however, and with his records and some of Mr. W. D. Hincks', there is the usual good list of captures to report. Eighteen species new to the county have been identified.

V.C. 61.—*Enicmus consimilis* (Mann.), *Aphthona euphorbiae* (Schr.) (the record of this species in Stephen's *Manual* refers to *A. venustula*), *Chaetocnema confusa* (Ill.).

V.C. 63.—*Stenolophus mixtus* (Herbst.), *Harpalus* (*S. Ophonus*) *angusticollis* Muell., *Hydrochus brevis* (Herbst.), *Ptinella aptera* (Guér.), *Neobisnius cerrutii* (Grid.), *Agaricochara latissima* (Steph.), *Tachyusa coarctata* Er., *Atheta coriaria* (Kr.), *Calodera uliginosa* Er., *Euplectus nanus* (Reich.), *Cantharis cryptica* Ashe, *Tarsostenus univittatus* (Rossi), *Dacne bipustulata* (Thunb.), *Atomaria fuscicollis* Mann., *Ips sexdentatus* (Boern.).

V.C. 65.—*Agaricochara latissima* (Steph.).

In addition there are five new species for V.C. 61, sixty-four for V.C. 63, and eight for V.C. 65.

The weather has been too wet, cold and sunless for much active insect life, but probably the full effects of this will not be seen until next year.

Lepidoptera (E. Dearing) : The season has once again proved peculiar with regard to weather, a reasonably mild winter being followed by a spring and summer with low amounts of sunshine and variations of temperature being most noticeable during summer.

Despite the high level of ichneumon attacks upon the White Butterflies last year, the spring brood appeared in normal concentration, though it has been suggested that the imagines were smaller than usual. Later broods were sadly depleted, however, as were those of *Aglais urticae* L. Severe defoliation of Sycamore and Oaks by the larvae of *Erranis aurantiaria* Esp., *E. defoliaria* Clerck, and *Phigalia pilosaria* Schiff. was noted at Huddersfield ; of Lime by *Phalera bucephala* L. at Elland.

There have been no records of *Colias croceus* (G. in F.), so common in 1947. Dr. J. H. Elliott has seen a specimen of *Nymphalis antiopa* L. near Woodhall Bridge on August 27th.

Celaena leucostigma Hueb. and *Hadena conspersa* Schiff. are new records for the Elland area, where *Dira megaera* L. is now established.

Polygonia c-album L. Wakefield, 10/10; Cawthorne, 2/10; Elland, 2/10.

Celastrina argiolus L. Wideley recorded this season. Copmanthorpe, 26/4; Renshaw Wood, Tadcaster, 9/5; Deffer Wood, May; Sandal, 15/4; Brighouse, May; Elland, April; Halifax, September; Long Preston, 9/5.

Aegeria vespiformis L. Sandal, 12/9 (previous records only from Bishops Wood and Doncaster, Porritt).

Reports were received from Miss M. E. Ackerley (Long Preston), Mrs. J. Payne (Copmanthorpe), Messrs. E. Aubrook (Huddersfield District), J. Hooper (Wakefield), H. Spencer (Elland), E. Thompson (Dewsbury), and W. E. L. Wattam (Huddersfield), to whom thanks are tendered.

It is regretted that our Chairman, Mr. R. Procter, has left Yorkshire, and that Mr. H. Spencer, of Elland, so long a correspondent, is also leaving this autumn.

Trichoptera (H. Whitehead): Very few Caddis flies have been seen this year, due partly to the cold weather. No new county or vice-county records have come to hand. Several species have been noted in their old haunts, but only three from new localities. These are *Phryganea striata* L., ♂, Lake Gormire, 17/5/48, taken by Mr. K. G. Payne; *Philopotamus montanus* Don, ♂, Gurtof Gill, 15/5/48, and *Chaetopteryx villosa* (Fabr.), ♀, Goathland, 24/9/48, were captured by myself.

Ephemeroptera (John R. Dibb): Your recorder has had to rely upon general reports and a few records sent in for the purpose of judging the Mayfly conditions in the county during the present year. The indications are that the year has been generally poor and not as prolific as in 1947, which in turn could not be considered a good one.

Mr. E. Thompson records:

Leptophlebia marginata Linn. Imagines, Wyke, near Bradford, 20/6/48.

Cloëon dipterum Linn. Sub-imagines, Coxley Valley, Dewsbury, 19/5/48.

**Siphlonurus armatus* Eaton. Emroyd Common, Dewsbury, 6/6/48.

The last mentioned species is the first record for Vice-County 63.

Mr. Whitehead adds the following:

**Cloëon dipterum* Linn. Imagines, Lake Gormire, 17/5/48.

Rhithrogena semicolorata Curt. Full grown nymphs, Boltby and Gurtof Gill, 15/5/48.

Ecdyonurus venosus Fab. Full-grown nymphs, Boltby and Gurtof Gill, 15/5/48.

**Leptophlebia marginata* Linn. Swarm of ♂♂ dancing, 2 p.m. (G.M.T.), Lake Gormire, 17/5/48.

The first and last of the above-mentioned species represent new Vice-County 62 records. A good indication as to whether hatchings of Mayflies have taken place in fair numbers in any locality can be obtained by an examination of spiders webs. It is of interest to note that during Mr. Whitehead's visits to Goathland in April and September this year no specimens could be traced in webs. This is a strong indication of the poor season in that locality. It may also be of interest to record that the writer has found the present year to be similarly extremely poor in Mayfly productivity in the counties of Derbyshire and Nottinghamshire.

In conclusion, this year's report shows that the collecting of Ephemeroptera records even in such a poor season as the present one has been of value from the county recording point of view because it has produced three new vice-county records to our list, indicating that the only need to considerably extend the Yorkshire records is more widespread collecting of the Order, particularly in the comparatively neglected Vice-Counties 61 and 62.

Diptera (Chris. A. Cheetham):—Diptera have been scarce owing to the lack of sunshine and good days for collecting. Hoverflies, with the exception of Droneflies, have been few and Craneflies scarce, whilst the troublesome woodland flies have not been in evidence. One insect that has appeared to me more frequently than ever previously is *Cynomyia mortuorum* L., and I have formed the opinion

that the large numbers of unburied dead sheep is the reason for the increase; another species, *Protocalliphora groenlandica* Ztt., may also come under this heading.

Probably the lack of many Craneflies induced one to take *Prionocera turcica* Fab. (*Tipula Diana*) in several new areas. It seems probable that the capture of Craneflies more often in wet areas will extend the known distribution of this species. Another way of adding to our knowledge of distribution may be by concentrating on larvae; at the Thirsk meeting Mr. H. Whitehead collected hatched out larvae of *Mochlonyx culiciformis* De Geer. (*velutinus* Ruthé). The only other Yorkshire record for this species is Austwick Moss, where I collected pupae which I kept until they emerged.

Two interesting records for the same insect and place are those of Messrs. Payne and Bramley of *Xiphura nigricornis* Mg. from Askham Bog. A number of additions to V.C. records will be found in the reports of Union excursions. An interesting capture was made at Spurn by Mr. W. D. Hincks, *Anthrax paniscus* Rossi., apparently in the identical place where I had it in plenty in 1919; it is parasitic on bees which nest in the old soil wall of the cottage garden. Mr. W. A. Thwaites, of Masham, has added a new species to the Yorkshire list, *Oxycera formosa* Mg., collected August, 1948, at Masham, and Mr. E. W. Aubrook added another species, *Prostegana curvipennis* Fal., which he collected at Cawthorne, August 1st, 1948.

Hemiptera (J. M. Brown): So far as I have been able to judge, Hemiptera, like other insects, have been very scarce this season. The only material to hand was sent to me by H. Whitehead, and consisted of six species of aquatic bugs: *Nepa cinerea* from Butterdale, near Gormire, 17/5/48; *Corixa sahlbergi* and *C. semistriata* from a peaty pool near Randy Mere, Goathland; *C. linnei*, 9/4/48; *C. semistriata*, 9/4/48, 20/9/48; *C. sahlbergi*, 9/4/48; *C. nigrolineata*, 20/9/48; and *C. wollastoni*, 20/9/48. Of these *C. wollastoni* is an upland species, and *C. semistriata* is new to V.C. 62 and is not a very common species.

Neuroptera (J. M. Brown): Green Lacewings were fairly numerous in flight in the garden in the evenings of late June. The species noted were *Chrysopa vittata* and *C. carnea*.

Orthoptera (J.M. Brown); Grasshoppers have been very scarce so far as my observation goes, but W. D. Hincks sends the following very interesting notes: 'I am able to confirm the two interesting long-horn Orthoptera I told you of last year. I took a number of nymphs of *Conocephalus dorsalis* (Latr.) at Long Bank Dyke, Kilnsea, on June 21st, 1947, and a single nymph of *Roeseliana roeselii* (Hagenback) along with them. I failed to rear them. This year I visited the dyke on July 22nd and found plenty of immature *Conocephalus* and a few *Roeseliana* nymphs in the same spot. Of these I succeeded in rearing an adult female *C. dorsalis* and a fine male *R. roeselii*. Ainsworth, of Hull, told me that he had seen long-horned Grass-hoppers in another dyke near Kilnsea village and later he sent some battered specimens of *C. dorsalis*. On September 30th I again visited the dyke and found the adults of *C. dorsalis* very abundant on *Scirpus* in the same restricted area. This time I could find no trace of *Roeseliana*, which may have been over. The Rev. T. B. Kitchen has shown me an immature pair of *Metrioptera brachyptera* (Linn.) from Dunnington, York, 27/6/47.'

C. dorsalis is new to Yorkshire, and this is the farthest north locality. *M. brachyptera* has occurred at Thorne Moor and Strensall. Malcolm Burr records *Roeseliana roeselii* from Yorkshire without definite locality, but his map suggests Spurn.

Hymenoptera (W. D. Hincks): During the past season climatic conditions, generally speaking, have been definitely unfavourable for insects of the present order which require warm sunny weather in order to reach normal abundance. It was fortunate therefore that the visit of the Entomological Section to Spurn in July this year coincided with a spell of relatively favourable weather. Hymenoptera, during our visit, were particularly plentiful, especially members of the family Ichneumonidae, which were almost absent during the excursion in June, 1947. Such marked differences between the insects taken at Spurn in June, 1947, and July

1948, were noted that it has been considered advisable to delay the publication of the report of the excursions in order to visit the area again in August.

The Ichneumonids taken especially favoured the flowers of the Wild Carrot and Celery which were at their best in July and attracted large numbers of species and individuals on sunny days. Aculeates also were fairly abundant but represented by fewer species. The smaller parasitic groups occurred in very much the same numbers as in 1947 but many different species were met with.

In the list which follows this report some of the additions taken during the 1947 Spurn excursion are brought forward in view of the delay in preparing the main report wherein fuller details of the habitats and ecology of the species will be given. Most of the 1948 Spurn material is yet undetermined and must therefore be reviewed at a later date.

In 1947, at Masham, collecting in late October proved excellent for parasitic Hymenoptera, but this year, a month earlier, the results were much less satisfactory. Brief visits to Howden, Skipwith and again to Spurn at the end of September produced very few insects and it seemed that the season had come to an end prematurely, perhaps due in part to the unusually low temperatures and slight night frosts of early September.

The recorder has been fortunate this season in receiving a considerable number of specimens of Parasitica from Mr. W. A. Thwaites, of Masham, including some interesting additions from our least worked Vice-County 65. Mr. J. Wood has continued his valuable and intensive collecting in the Keighley district.

As no list of additions to the county records has appeared for 1947 opportunity has been taken to include them in the present report. In order to keep the list within reasonable bounds only those records which are new to the county or vice-counties are included. This means that a very large number of valuable and interesting records are excluded which must await more favourable conditions before they can be published.

The additions include 4 species new to the British List, 27 new to the county, and 29 new vice-county records. Descriptions of the three species of *Polynema*, new to science, included in the list, are now in the press.

Additions to the Yorkshire List of Hymenoptera

(† New to county ; * New to vice-county.)

Symphyta

Athalia rosae* (L.) (*colibri* Christ), the Turnip Sawfly. Spurn, 61, 1♀, 16/6/47, 1♀, 18/6/47, W.D.H. (*Ent. Mon. Mag.*, **84, 1948, 177). There is an old record in the Victoria County History from Wakefield.

**A. bicolor* (Lep.). Spurn, 61, 1♂, 16/6/47, W.D.H.

**A. cordata* (Lep.). Spurn, 61, 1♂ 1♀, 18/6/47, W.D.H.

**Cladius difformis* (Panz.). Leeds, Oakwood, garden, 1♂, 17/7/43, W.D.H.

Braconidae

†*Bracon larvicida* Mshl. Spurn, 61, 1♀, 16/6/47, W.D.H.

†*Hormius moniliatus* (Nees). Seckar Woods, 63, 1♂ 1♀, 3/7/43, W.D.H.

**Rogas circumscriptus* Nees. Spurn, 61, 1♀, 15/6/47, W.D.H.

†*Apanteles viminetorum* (Wesm.) (*fuliginosus* Wesm.). Spurn, 61, 1♀, 13/6/47, W.D.H. (det. G. A. Nixon).

A. gracilariae* Wilk. (*fuliginosus* Mshl. *nec* Wesm. and *fuliginosus* of Yorkshire List, Butterfield and Lyle, *Nat.*, 1929, 305-308). This species is a parasite of the Lilac leaf-miner (*Gracillaria syringella* (F.)) and is recorded from Halifax by Lyle and from York (V.C.?), 1♀, 24/7/30 (W. G. Clutten) (Wilkinson, *Proc. R. Ent. Soc. Lond.* (B.), **9, 1940, 28). Leeds, Chapel Allerton, *64, 2♀♀, 8/9/48, H. Whitehead.

**A. difficilis* (Nees). Hole of Horcum, 62, 1♀, 5/6/37 ; Whitby, 62, 1♂ 1♀, 21/6/37, H. Britten, Jun.

**Rhizarcha pubescens* (Curtis). Spurn, 61, 1♀, 18/6/47, W.D.H. (det. G. A. Nixon).

†*Dacnusa abdita* Hal. Kilnsea village, 61, 1♀, 20/6/47, W.D.H. (det. Nixon).

†*D. elegantula* Nixon. Spurn, 61, 1♀, 17/6/47, W.D.H. (det. Nixon).

APHIDIIDAE

**Ephedrus plagiator* (Nees). Masham, 65, 1♀, 7/8/48, W. A. Thwaites.
**E. lacertosus* (Hal.). Masham, 65, 11, 12/10/47, W.D.H.
**Dyscritulus planiceps* (Mshl.). Masham, Swinton Park, Jervaulx, 65, cocoons common on sycamore leaves in mid-October, 1947, W.D.H.

ICHNEUMONIDAE

†*Spilichneumon occisorius* (F.). Spurn, 61, 1♀, 16/6/47, W.D.H.
†*Hemiteles inaequalis* (Fst.). Spurn, 61, 13, 16/6/47, W.D.H.
†*Gelis speculator* (Fst.). Spurn, 61, 13, 15, 19/6/47, W.D.H.
**G. anthracinus* (Fst.). Spurn, 61, 13, 15, 19/6/47, W.D.H.
**G. instabilis* (Fst.). Spurn, 61, 15, 16/6/47, W.D.H.
†*Rhyssella curvipes* (Grav.). Askham Bog, 64, 1♀, 15/6/46, W.D.H. A parasite of the Wood-wasps, *Xiphydria* spp.
†*Xorides fuligator* (Thunb.) (*pilicornis* Grav.). Aberford, 64, 1♀, 29/5/44, J. Wood. A rare species of a group which parasitise xylophagous insects, especially longicorn beetle larvae.
†*Callidiotes* (*Oxytorus*) *armatus* (Thoms.). Keighley, 63, Holmehouse Wood, 1♂, 9/8/42, 1♀, 7/8/43, J. Wood (det. G. J. Kerrich).
†*C. lucidator* (Grav.). Bolton Woods, 64, 1♂, 5/7/41, J. Wood (det. Kerrich).
**Allocamptus undulatus* (Grav.). Ilkley, 64, 1♀, 1947, R. Procter.

CHALCIDOIDEA

†*Aphidencyrtus aphidivorus* (Mayr.). Knaresborough, 64, 1947, bred from cocoons of *Dyscritulus planiceps* (Mshl.), A. E. Winter. This species was accidently omitted from Kloet and Hincks, 1945, *A Check List of British Insects*.
†*Ectroma rufum* (Dalm.). Spurn, 61, brachypterous ♀, 16/6/47, W.D.H.
**Macroneura vesicularis* (Retz.). Spurn, 61, 3♀♀, 16/6/47, W.D.H.

TRICHOGRAMMATIDAE

†*Trichogramma semblidis* (Aurivillius). Bingley, St. Ives, 63, 1♂, 31/5/47, J. Wood; Masham, *65, 1♀, 14/10/47, W.D.H. This species was accidently omitted from Kloet and Hincks, 1945.
**T. evanescens* Westw. Askham Bog, 64, 1♂ 1♀, 27/5/47, W.D.H.

MYMARIDAE

**Polynema gracile* (Nees). Keighley, *63, Holmehouse Wood, 3♀♀, 13/9/47, 1♀, 18/10/47; Sunnydale, Morton, 5♀♀, 27/9/47, 9♀♀, 8/10/47; Bingley, Beckfoot, 6♀♀, 23/8/47, 3♀♀, 30/8/47; Hebden Bridge, Colden Valley, 1♀, 6/9/47, J. Wood. Masham, *65, in profusion, 17-19/10/47, W.D.H.; 2♀♀, 27/6/48, and common in August, September, and 5-8/10/48, W. A. Thwaites. Jervaulx, 5♂♂, 23/10/47, W.D.H.
**P. fumipenne* Hal. in Walk. Spurn, 61, 1♀, 18/6/47, W.D.H.
**P. longulum* Foerster. Masham, 65, 1♀, 7/8/48, W. A. Thwaites.
†*P. euchariforme* Hal. Shipley Glen, Rough Side, 64, 1♀, 9/8/47, J. Wood. Masham, *65, 4♀♀, 8/48, W. A. Thwaites.
†*P. fuscipes* Hal. Masham, 65, 1♀, 7/8/48, W. A. Thwaites.
†*P. woodi* Hincks. Askham Bog, 64, 2♂♂ 2♀♀ (incl. Type), 27/5/47, 1♀, 17/5/46, 1♀, 1/6/46, W.D.H. Masham, *65, 1♂, 7/8/48, W. A. Thwaites.
†*P. waterhousei* Hincks. Selby, Brayton, 64, 1♀, 23/8/44 (Type), W.D.H. Masham, *65, 1♀, 12/10/47; Jervaulx, 1♀, 13/10/47, W.D.H.
†*P. bakkendorfi* Hincks. Bingley, St. Ives, 63, 12♀♀ 4♂♂, 24/5/47 (incl. Type), 1♀, 20/9/47, 1♀, 11/10/47, J. Wood; 1♀, 8/9/45, W.D.H. Selby, Brayton, *64, 3♀♀ 1♂, 22/4/46, W.D.H.
†*Ooctonus hemipterus* Hal. Masham, 65, 1♀, 17-19/10/47, W.D.H.
**O. heterotomus* Fst. Keighley, *63, Silsden, 2♀♀, 8/10/47, 4♀♀, 27/9/47; Holmehouse Wood, 4♀♀, 13/9/47; Old Cut River, 1♀, 27/7/47; Newsholme Dene, 1♀, 17/8/47, J. Wood. Hebden Bridge, Colden Valley, 7♀♀ 1♂, 28/7/47, 3♀♀, 1/8/47, 2♀♀, 6/9/47, J. Wood. Bingley, Beckfoot, 1♀, 30/8/47 (var. *notatus* Hal. in Walk.), J. Wood. Masham, *65, 19/10/47, W.D.H.; 7/8/48, 5-8/10/48, W. A. Thwaites.
†*Litus cynipseus* Hal. Jervaulx, 65, 2♀♀, 13/10/47, W.D.H.

PROCTOTRUPOIDEA

†*Proctotrupes gravidator* (L.). Spurn, 61, 15, 16/6/47, W.D.H.
†*Galesus bispinosus* Kieffer. Horton-in-Ribblesdale, 64, 1♀, 26/8/45, W.D.H.

†*Galesus försteri nigricornis* Kieffer. Helwath Beck, 62, 1♂, 26/9/37, H. Britten. Previously only known from the male type from Scotland.

†*Pantopiesta flaviventris* (Thoms.). A genus and species NEW to Britain (see *Ent. Mon. Mag.* in press). Leeds, Oakwood, in garden, 1♀, 12/8/39, W.D.H.

†*Xenomerus ergenna* Walk. Spurn, 61, 1♂, 16/6/47, W.D.H. (det. G. A. Nixon) Specimen retained in the collections of the British Museum (N.H.).

†*Paragyron algicola* Kieffer. Spurn, 61, 2♀♀, 16/6/47, W.D.H. Hitherto known only from the Isle of Wight, in seaweed.

**Inostemma boscii* (Jur.). Keighley, *63, Old Cut River, 2♀♀, 5/8/47, 1♀, 6/8/47, 2♀♀, 25/7/47, J. Wood. Masham, *65, -/8/48, W. A. Thwaites.

BETHYLIDAE

†*Pseudogonatopus distinctus* (Kieffer). Spurn, 61, 16/6/47, W.D.H.

†*Gonatopus sepsoides* Westw. Spurn, 61, 13, 15, 16/6/47, W.D.H.

†*Neogonatopus lunatus* (Klug.). Kilnsea, 61, Long Bank Dyke, 1♀, 21/6/47, W.D.H.

BOTANY

(Chris. A. Cheetham) : Unfortunately, two of our usual recorders have been incapacitated by illness during this year and we miss their help in drawing up this report. Mr. E. R. Cross has supplied news from the Scarborough district for many years as did Mr. Malins Smith from the Bradford area. They were often with us in the field and at our indoor meetings. We trust they may be restored to health in the coming year.

1948 has been abnormal in many respects. The weather is well described in Mr. W. E. L. Wattam's report for the Huddersffeld district which follows :

(W. E. L. Wattam) : The last three months of 1947 gave mild conditions, the only wintry setback being in mid-November (15th to 19th) with a snowfall of three inches and frost reaching 19 degrees. This cold spell was followed by the sunniest November week ever recorded in the local meteorological records ; the total November sunshine was 73·7 hours. Rainfall during that month totalled 5 in. December, until towards its close, brought no severe wintry conditions. The rainfall was only 2·4 in. January, 1948, was remarkable for the constant succession of S.W. and N.W. gales with heavy falls of sleet and rain. There were four slight snowfalls, two of 2 in. and two of 4 in. Not a single day was fine during the whole 24 hours. The total rainfall was 11·63 in.

South-West gales with heavy rainfall were the prominent features in February, but the comparative mildness favoured plant life in the sheltered situations. From this month onwards weather conditions were good and vegetative growth was normal. March had 128 hours of sunshine against an average of 97, whilst the rainfall was only 1·63 in. The response of early wild flowers and leafage of shrubs was most marked. There was a magnificent display of blossoms by Daffodils, Grape Hyacinths and Scillas.

During April cultivated trees and shrubs, in particular the Almond and double varieties of Cherries, as well as the Wild Cherry, furnished a gorgeous display of blossom. The rainfall for the month was only 1·98 inches. The opening days of May were not congenial, the first two days bringing snow and sleet. There was no change in the semi-wintry conditions until the 16th when vegetation was damaged by a strong N.E. gale. Then came a welcome change, temperatures rising to 78 degrees. The response of plant life was quick. The Hawthorn and Horse Chestnut in particular produced lavish displays of bloom. My memory does not recall such a heavy production of male blossom by the Oak trees, *Quercus Robur, Q. petraea* and *Q. cerris,* giving the boughs of many of these trees a mossy, bearded appearance. The leafing of the Ash was much behind that of the Oak. Even on the 31st May on many of the aged trees in the upper part of the Colne Valley the leaf buds were only just beginning to unfold. Ash blossom has been sparse, the best flowering noted was in the Holme Valley. This is quite a contrast to the heavy blossoming of this tree in 1947. Lilac, Laburnum, and the crimson and pink varieties of the flowered Thorn trees gave a magnificent blossom display. The flowering of ground vegetation in general was excellent despite the lack of rainfall and the ground frosts. The rainfall for the month was only 2·21 in.

From June to September low temperatures, only occasional bursts of sunshine, and quite out-of-season gales with much rainfall have comprised the make-up of our summer.

The moist conditions brought a high and extended display of wild flowers, but delayed the harvesting of Wheat, Barley, Rye and Oats. Of the smaller bush fruits, Black Currants have been good. Wild Roses are heavily laden, *Rosa tomentosa* in particularly furnishing a gorgeous picture of red-orange fruits. The Bilberry crop has only been medium, dryness and late frosts having affected the excellent blossom display in early May. Black Crowberry and Cloudberry crops are poor; moorland fires in the Chew Valley, at Holmfirth and Dunford Bridge being in great part responsible for the poor yield. The fruits of Wild Raspberry have been abundant, whilst the Bramble and Dewberry are awaiting sunshine to complete the growth of a bumper crop.

Defoliation of Oak and Sycamore trees in the upper part of the Dearne Valley, Magdale, Meltham and Holmfirth Valleys, in May and June, by larvae of *Tortrix viridana*, *Phigalia pilosaria*, *Hybernia defoliaria* and *H. aurantiaria* was especially noticeable. Also in many places in the district the first foliage of the Apple trees was badly damaged by moth larvae. After the attacks new leaf production was quickly stimulated, and by mid-July the trees had recovered.

A further feature has been the extended normal growth of the main axis buds in late July. This abnormal growth was only sporadic in widely-scattered parts of the district, and was prominent chiefly on the Oak, Sycamore, Birch, and to a lesser degree on Wild Cherry, Ash, Hawthorn, Hazel and Mountain Elm.

FRUITING OF TREES IN THE HUDDERSFIELD DISTRICT, 1948

Tree	Leaf	Flower	Fruit Crop	
Oak (*Quercus Robur* and *petraea*)	April 12	May 8	Excellent	Male flowers prolific : in dense masses
Turkey Oak (*Q. cerris*)	May 7	May 15	do.	Do.
Mountain Elm	April 3	Mar. 12	Prolific	
Horse Chestnut	,, 10	May 8	Excellent	Much damage done by July gale
Sycamore	,, 10	April 26	Prolific	
Hawthorn	,, 10	May 8	do.	
Elder	,, 10	June 1	do.	
Alder	,, 17	Mar. 18	Excellent	
Mountain Ash	,, 17	May 15	do.	
White Beam (*Sorbus aria*)	,, 17	,, 20	Medium	
Holly (new leafage) ...	,, 17	,, 8	Quite good	
Hazel	,, 26	Feb. 17	Very mod.	
Lime	,, 26	June 26	Medium	
Beech	,, 26	May 15	Quite good	
Ash (5-year-old trees)	May 5			
Ash (aged trees) ...	,, 12	,, 7	Poor	
Wild Cherry	April 26	April 17	Very good	
Birch	,, 10	Mar. 18	Excellent	
Apple (Cult.)	,, 10	April 26	Poor	
Wild Crab	,, 10	,, 26	do.	
Pear (Cult.)	,, 26	,, 17	Excellent	
Field Maple	May 2	May 10	Quite good	

Miss Rob found the early spring flowers such as Violets, Plums and Apples, exceptionally good, but later blossoms were only moderate and plants produced much vegetative growth.

Mr. Lewis in the South-East of the county says that the mild January gave flowers of Snowdrop, Primrose and Celandine in February. In May they had the best show of Hawthorn blossom for many years, and Pear Apple, Mountain Ash, and Wild Rose flowers were prolific.

Mr. Bramley writes: Grass has been abundant, Wheat good, Oats and Barley above average. He says a feature of the corn lands has been the quantity of Wild Oats (*Avena fatua* L.) that has appeared, much more than he could remember seeing before. This has been noted further south in a paragraph in a recent issue of the *Farmer and Stock Breeder*.

Your Secretary has been impressed by the very fine display of flowers of many plants, including Primrose, Sloe, Gorse, Bugle, Violet and Eyebright and members who were present on the excursion to the small lake near Gormire will long remember the wonderful display of flowers of Hawthorn and Bogbean.

Another feature of the year has been the great growth of vegetation, especially the grasses and ferns during the second half of the year. The dry months, March, April and May, had restricted growth making the early hay crop poor. When growth increased later on it came with weather that made work on the land difficult.

The earliest flowers on the Purple Saxifrage on Penyghent were seen on March 5th. The year evidently suited the Bog Andromeda, for on Austwick Moss it had three flowering periods; late March, late July and mid September. It appeared as if the weather kept the bog pools on the Moss too cold for the Bladderwort, which was not seen until late September. Normally I have found the earliest flowers of the Coltsfoot and Celandine about the same date, but this year Coltsfoot was in bloom on February 12th, but I could find no Celandines until March 10th. In last year's report it was suggested that the defoliation of the Hazel in May might be the reason for the lack of nuts, but this year the trees were again eaten bare in May and now have a good crop of fruit.

Two things that naturalists should watch carefully are the effect of the extensive destruction of small woodland areas, and the effect of the great amount of deep drainage by machines on mountain sides and boggy areas. This must dry up streams quickly and many springs will be less regular in flow and plants will suffer.

Plant Records (W. A. Sledge): Of the Union's Excursions during 1948 that to Balne and Whitley Thorpe was the most productive, for though many interesting species were seen at Thirsk and Malham the floras of these areas have been so thoroughly explored that novelties were not to be expected. Though arrangements for excursions remain difficult to make, the results of the Balne excursion strengthen the view that greater efforts should be made to visit those parts of the county for which little information is available.

Geranium rotundifolium found at Whitley Thorpe is new to Yorkshire though whether it is indigenous there is uncertain. *Eleocharis uniglumis* is also new to Yorkshire and it is remarkable that it should have eluded detection for so long in such a very well-worked area as Askham Bog. Miss R. Kilby reports *Vicia lutea* and *Lathyrus Aphaca* in a cultivated field at Ravenscar. Both were plentiful though doubtless introduced, while another introduced species, *Epilobium pedunculare*, which has been reported from several stations in the last few years, continues to appear in widely-scattered parts of the county. Mr. John Brown has found *Barbarea stricta* in many places in the Thorne-Hatfield area where he has also found *B. intermedia*. He also sent me excellent specimens of *Carex serotina* from near Maltby. Mr. Brown recorded this two years ago in a quarry at Shireoaks just within the county boundary and it is very satisfactory to have a second locality for this species well within South-West Yorkshire. I know of no other stations for this sedge in Yorkshire.

One of the most interesting records for the year is Mr. C. A. Sinker's rediscovery of *Armeria maritima* between Settle and Malham. It was first recorded 'at the head of Stockdale Fields, Settle,' by John Ray in 1690, and was seen by F. A. Lees in 1870, but no living botanist had seen it there until Mr. Sinker's rediscovery of some half-dozen non-flowering plants which he says were hardly distinguishable from the surrounding turf so close had the sheep cropped them. It is now evidently much reduced in quantity as Lees referred to it as locally abundant.

The following list includes the noteworthy records for the year:

Clematis Vitalba L. (63) Hedge of lane east of Letwell; J. Brown.
Ranunculus parviflorus L. (62) Cornfield north of Filey Brigg; Miss R. Kilby.
Helleborus viridis L. (63) Field border near Letwell and hedge side near Thwaite House, south-west of Firbeck; J. Brown.
Aquilegia vulgaris L. (63) A few plants in Norwood, Roche Abbey Valley; J. Brown.
Actaea spicata L. (65) Wood by River Ure above Masham; W. A. S.
Barbarea stricta Andrz. (62) Still at Clifton Ings, York, also at Naburn Ings; K. G. Payne. (63) In several stations in the Thorne-Hatfield area usually on dike banks; near Trumfleet Grange, between Trumfleet and Haywood;

near Fishlake, between Thorne and Hatfield and near Brier Hills Farm on the Hatfield-Sandtoft road ; J. Brown.

B. intermedia Bor. (63) In a field of clover and Italian rye-grass near Brier Hills Farm near Hatfield ; J. Brown.

Erysimum cheiranthoides L. (63) Field border near Brier Hills Farm near Hatfield ; J. Brown.

Viola canina L. (62) Pilmoor ; Y.N.U. Excursion.

Saponaria officinalis L. (63) Plentiful by the banks of the Don between Tinsley and Rotherham, mostly double-flowered ; also canal side between Kilnhurst and Mexborough ; J. Brown.

Stellaria palustris Retz. (64) Crossflats, Bingley ; G. A. Shaw.

Arenaria tenuifolia L. (63) In another part of Lindrick Common, a few plants ; J. Brown.

Malva neglecta Wallr. (*M. rotundifolia* auct.) (63) Between Heck and Hensall ; W. A. S., G. A. Shaw and F. Murgatroyd.

**Geranium rotundifolium* L. (63) Sandpit, Whitley Thorpe; W. A. S. and G. A. Shaw. New to Yorkshire.

G. columbinum L. (63) Quarry between Maltby and Tickhill ; J. Brown.

Astragalus glycyphyllos L. (63) In plenty near entrance to limestone quarry between Firbeck and Kingswood ; J. Brown.

Vicia lutea L. (Det. Kew) (62) Plentiful in a field of beans and oats at Ravenscar ; Miss R. Kilby.

Lathyrus Aphaca L. (Det. Kew) (62) With the preceding at Ravenscar ; Miss R. Kilby.

Epilobium pedunculare A. Cunn. (62) Castleton Rigg ; C. M. Rob. (63) Roadside near Widdop Reservoir near Halifax at 1,000 ft., well established ; F. Murgatroyd.

Heracleum Mantegazzianum Somm. and Lev. (61) Plantation at Hollym near Withernsea ; R. Lewis.

Sambucus Ebulus L. (63) Plentiful round a sewage works at Intake, Sheffield ; J. Brown.

Valerianella rimosa Bast. (63) West Moor between Armthorpe and Hatfield ; J. Brown.

Senecio squalidus L. (64) Railway embankment by the bridge on the York-Tadcaster road ; K. G. Payne.

Crepis biennis L. (63) Norwood, Roche Abbey Valley and in a lane over West Moor between Armthorpe and Hatfield ; J. Brown.

C. taraxacifolia Thuill. (63) Firbeck on waste ground ; J. Brown.

Jasione montana L. (63) Crimsworth Dene near Halifax, one plant ; F. Murgatroyd. Sand pit north of Heck ; Y.N.U. Excursion.

Armeria maritima Willd. (64) Refound at Stockdale between Settle and Malham ; C. A. Sinker.

Polemonium caeruleum L. (64) Blue Scar, Arncliffe ; G. A. Shaw.

Cynoglossum officinale L. (63) Roadside near Denaby Halt Station, near Mexborough ; J. Brown.

Mentha rotundifolia (L.) Huds. (63) Great Horton near Bradford ; Mrs. J. Appleyard.

Lamium hybridum Vill. (63) Gravel pit north of Heck ; W. A. S.

Asparagus officinalis L. (61) Humber foreshore near Ferriby ; R. Lewis.

Potamogeton coloratus Hornem. (61) Kelleythorpe Marsh near Driffield ; R. Lewis.

**Eleocharis uniglumis* (Link.) Schult. (Det. S. M. Walters) (64) Marshy field bordering south side of Askham Bog ; L. F. H. Merton. New to Yorkshire.

Eriophorum latifolium Hoppe. (64) Linton Moor, a mile north-west of Cracoe near Grassington ; G. A. Shaw.

Carex serotina Mérat (*C. Oederi* auct.) (63). Marshy ground in limestone quarry between Maltby and Tickhill ; J. Brown. Excellent material of this very rare Yorkshire sedge.

C. Pairaei F. Schultz. (63) Dry bank north of Heck on the Hensall road ; G. A. Shaw and W. A. S.

Avena fatua L. (63) West Moor between Armthorpe and Hatfield ; J. Brown.

Poa compressa L. (63) Wall top at Letwell and in disused limestone quarries between Tickhill and Maltby, and between Firbeck and Kingswood; J. Brown.

Hordeum europaeum (L.) All. (63) Cuthbright Wood between Harthill and Thorpe Salem ; J. Brown.

Osmunda regalis L. (63) Wet rocks in Ryburn Valley, Halifax ; F. Murgatroyd.

Lycopodium clavatum L. (63) Roadside between Gorple and Widdop, Halifax ; F. Murgatroyd. In small quantity in Wyming Brook, Upper Rivelin Valley, Sheffield ; J. Brown.

Chara vulgaris L. var. *longibracteata* Kutz. (Det. G. O. Allen) (61) Pond, Kelleythorpe Marsh near Driffield ; R. Lewis.

C. vulgaris L. var. *papillata* Wallr. (Det. G. O. Allen) (61) Pond on cliff top, south end of Withernsea ; R. Lewis.

Ecology (Miss D. Hilary) : Investigation into the Cause of the Degeneration of Juniper on Moughton Fell. A visit was paid by two members of the Ecological Committee on December 27th and 28th, 1947, to the Juniper area on Moughton Fell. Their chief object was to study the effects of the exceptional period of frost and snow in February and March, 1947. Their conclusion was that no noticeable difference could be seen in the Juniper since a visit paid in 1946 and that the effects of the severe period of 1947 had been negligible. Samples of Juniper wood from dead bushes on the area S.E. of Thieves Moss were collected in order to see whether they threw any light on the reason for the dying off of the bushes. Owing to our Chairman's illness these have not been dealt with yet, but it is hoped to give a report on them later.

From Mr. Wattam comes the report of the continued growth of the Juniper seedlings which he reared. The plants raised from matured seeds and subsequently planted in his garden are now 33¾ in. high (an increase of 7¼ in. in the past three years) with typical bushy habit. Although several small branches were partially killed by the frost of 1946, pruning away the dead branches stimulated new growth by the living portions. The seedling growing in soil obtained from Moughton Fell had its apical growing point destroyed in the 1946-47 winter, but two small shoots, each with ten small leaves, have since appeared.

An interesting development from this work on the Yorkshire Juniper is the fact that, through the influence of our Chairman, the botanical section of the London Natural History Society has now undertaken to make a Juniper Survey of the Downs. According to correspondence received, Juniper appears to be a scarce plant in this Society's area and one correspondent states that in Wiltshire it appears to be moribund on at least one Down, while there is almost everywhere a noticeable absence of young plants, facts which coincide with our own observations on Moughton.

Study of Heather Moor at St. Ives, Bingley.—There is nothing further to report since last year when the work was almost completed. There are, however, two gaps in that report, viz. a full account of the regeneration after burning and a complete list of the insects. We hope soon to be able to fill in these gaps.

Ecological Survey of Insects at Spurn.—Mr. Hincks sends the following report : The Entomological Section again visited Spurn in July and were so impressed with the difference in the fauna compared with June, 1947, that they have decided to hold a further excursion there in August before finally publishing their report. Members of the section have made a thorough, though general, survey of the insects of the peninsula, which, it is hoped, will serve as a useful basis for more detailed ecological workers in the future.

Distribution of the Butterbur (*Petasites hybridus*) in the Huddersfield District.—Mr. W. E. L. Wattam sends the following report : During the spring months of 1947-48 I interested myself in the request by Dr. D. H. Valentine of Durham regarding the distribution of the above plant in the Huddersfield district (*Naturalist*, 1946, 45-46). I have worked out the present status of this plant for the whole length of the Rivers Colne and Holme, the upper part of the River Dearne from source as far as Kexborough and the borders of the Leeds and Liverpool Canal. I paid special attention to the occurrence of the female flowering plants. small colonies of female plants were found at Colnebridge, Woodsome Lees and an extremely large colony on the Kirkheaton Road at Tandem. The latter is the oldest site in our district ; my own recollection of it dates back 60 years. Here in the spring of 1947, 247 females spikes were produced. In 1943 deposits of waste materials, chiefly of ashphalt blocks and clinker, were tipped on certain portions of the site, but the female colonies overcame all obstacles. In the spring of 1948, 315 female spikes were noted. There is an abundance of the male plant also.

No seedling plants have been found on any of the sites where female colonies occur, nor on the ground adjacent thereto.

I cannot close this report without expressing the very deep regret of all our members at the resignation on account of ill health of our Chairman, Mr. Malins Smith, who has held that office since the formation of the Committee in October, 1928. During its whole existence he has been its inspiration and guide and his place will be very difficult to fill. Although feeling obliged, due to the state of his health, to resign his office, we are assured of his continued interest, and we hope to have the help of his experience and advice for many years to come.

Bryology (H. Walsh): I am able to report that an increased interest has been apparent during the year, both in mosses and liverworts. Contributions from members have appeared in *The Naturalist* during the year and two well-attended field meetings have been held. A report on the Spring Meeting at Bolton Woods has appeared in *The Naturalist* and one on the Autumn Meeting at Austwick is in preparation. The Section has been well represented at the Union's excursions and reports have been contributed on each meeting. Mr. G. A. Shaw has collected about 350 mosses from various areas in V.C. 64 and 65.

From the Halifax district a few mosses have been found for which we have only old records and a list of these will eventually appear in *The Naturalist*. One of these old records for *Andreaea Rothii* Web. & Mohr. by the Todmorden botanist, A. Stansfield, for the Hebden Valley, and two cloughs to the west of it, about 1830, has been found again by Mr. G. A. Shaw in the Hebden Valley. On a visit there in summer a number of mosses were collected and among them the *Andreaea*, but the position where collected was uncertain. A second visit located the moss growing on rocks in the river at High Greenwood.

The following are new vice-county records.

Sphagna

S. auriculatum Schp. var. *tenellum* Warn. (64) Embsay Moor, near Skipton; A. Thompson. New to V.C. 64. *Trans. Brit. Bry. Soc.*, 1948: 118.

Mosses

Mnium riparium Mitt. (65) Shady banks of River Swale below Marske Bridge, near Richmond; G. F. Horsley. *Trans. Brit. Bry. Soc.*, 1948: 122.

Philonotis capillaris Lindb. (62) Gormire; G. A. Shaw.

Physcomitrium sphaericum Brid. (64) Lakeside, Copgrove Hall; E. C. Wallace. This is a new county record and an article appears in *The Naturalist*, 1948: 155-6, with particulars of the situation.

Webera annotina Schw. var. *erecta* Correns. (63) Mytholmroyd. (64) Austwick; H. Walsh. Probably more common than the records suggest. Other plants have been found about Halifax by marshy sides of rural lanes, sometimes along with toad rush.

Hepatics

Lophozia Kunzeana (Hub.) Evans. (64) Tarn Moss, Malham; E. C. Wallace, 1946. The first Yorkshire record. *Trans. Brit. Bry. Soc.*, 1948: 116.

Scapania irrigua (Nees.) Dum. (63) Heptonstall, near Hardcastle Crags; H. Walsh.

Other Moss Records of Interest

Seligeria acutifolia Lindb. (64) Cote Moor, near Kettlewell; G. A. Shaw.

Cynodontium Bruntoni B. & S., c. fr. (64) Bolton Abbey; G. A. Shaw.

Blindia acuta B. & S. (65) Rawthey Gill, Baugh Fell; G. A. Shaw.

Campylopus atrovirens De Not. (65) Taythes Gill, Baugh Fell; G. A. Shaw.

Grimmia apocarpa Hedw. var. *pumila* Schp. (64) Arncliffe; G. A. Shaw.

Rhacomitrium sudeticum B. & S. (65) Barbondale; G. A. Shaw. Certified by Brit. Bry. Soc. referee.

Encalypta ciliata Hoffm. (64) In fruit, Fountains Fell; G. A. Shaw.

Funaria calcarea Wahl. (64) Kettlewell; G. A. Shaw.

Orthodontium gracile Sch. var. *heterocarpum* Wats. (62) Reported on the Thirsk Y.N.U. Excursion as plentiful; A. Thompson. (63) Widely distributed in the Hardcastle Crags area and about Halifax; H. Walsh. (*Nat.* 1948, 132).

Orthothecium intricatum B. and S. var. *abbreviatum* Dixon. (64) Fountains Fell; G. A. Shaw. Certified by J. B. Duncan.

Hypnum eugyrium Schp. (64) Near Beezley Falls, Ingleton; C. A. Cheetham.

HEPATICS

Marchantia polymorpha L., *f. aquatica* Nees. Growing among *Typha latifolia*, Holgate, York; H. Walsh.

Aneura sinuata (Dicks.) Dum., var. *major* Lindb. (64). Damp ground, brickfield ponds near Holgate, York; H. Walsh.

The following hepatics from Mrs. Appleyard are new records for the locality given:

Eucalyx hyalinus (Lyell) Bridl. (64) Shipley Glen

Aplozia crenulata (Sm.) Dum. var. *gracillima* (Sm.) Heeg. *Lophozia incisa* (Schrad.) Dum. (65) Garsdale

Lophozia Muelleri (Nees.) Dum. (64) Ravensgill.

Leptoscyphus Taylori (Hook) Gray. (64) Ravensgill.

Calypogeia Neesiana (C. & M.) Massal. (64) Ravensgill.

C. arguta Nees and Mont. (64) Ravensgill.

Mr. G. A. Shaw has recently added *C. Neesiana* (C. & M.) Massal. for Hardcastle Crags (63).

Mycology (Jennie Grainger): Mr. A. A. Pearson's paper on 'The Genus Russula' in *The Naturalist* (1948: 85-108) has attracted wide attention amongst students of the Agarics and there has been a heavy demand for reprints of this very helpful guide to one of the most difficult genera of toadstools. In view of the great usefulness and popularity of short monographs such as this and the same author's 'Notes on the Boleti,' the Mycological Committee hopes that Mr. Pearson will continue to stimulate interest in the systematics of the Agarics by publishing monographs of other genera in the near future.

We must also note the 'Revised List of British Agarics and Boleti,' by Mr. A. A. Pearson and R. W. G. Dennis, published in *The Transactions of the British Mycological Society*, Vol. XXXI, Parts III and IV, 1948. This paper clarifies nomenclature and gives us an up-to-date basis for recording. The lists of Agarics published in the Foray Reports will in future be based on this new work.

Mr. T. Petch has brought out a 'Revised List of British Entomogenous Fungi' also in *Trans. Brit. Mycol. Soc.*, 31, 286-304, and we appreciate his gift of reprints.

The keeping of Records has exercised the minds of the Committee during our last two meetings. At Sheffield the following resolution was passed:

> 'People sending records for publication are encouraged to preserve specimens by numbers, and quote accession numbers in any lists submitted for publication.'

Material for preservation should be sent to any of the following institutions where there are Mycological Herbaria. University of Leeds Botany Department (Dr. W. A. Sledge); University of Sheffield Botany Department (Dr. T. E. T. Bond); University College, Hull, Botany Department (Mr. J. Webster); The York Museum; Ravensknowle Museum, Huddersfield (Mr. A. Broadbent). Mr. W. D. Hincks, Manchester Museum, would also like any specimens members could send him.

Mr. W. G. Bramley writes: 'Re my notes in *The Naturalist* (1948: 11-12): 'There has been hardly any bean rust, *Uromyces fabae* (Pers.) de Bary, this year. Aecidia were found on beans round a stack of last year's crop (1947) during late August. These were on young plants from seed shed when cattle got to the stack about mid-July.

'There was not much infection of Barberry this year by *Puccinia graminis* Pers. at Stutton and so far I have seen no infection of the alternate hosts except *Agropyron repens*. Aecidia were also seen near Fairburn in July where again *A. repens* was the only infected grass.

'Owing to the successional cropping of wheat-barley, there has been a considerable amount of disease caused by *Ophiobolus graminis* Sacc. (Take-all or Whiteheads) which has been aggravated by the wet season.

'A further comment on the wet and cold summer has been the appearance of numbers of bluestalks, *Tricholoma personatum* Fr., a species we generally expect to see in late autumn, as early as July 19th,

Mr. Bramley lectured to the Young Farmers' Club at Masham during the Foray. The audience showed keen appreciation of the lecture and of the slides and specimens shown.

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The NATURALIST

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Contents

	PAGE
The Entomology of Chanfuta Trees—*W. D. Hincks, M.P.S., F.R.E.S.*	41-42
Microscopic Measurements—*The late T. Petch, B.A., B.Sc.*	42
From a Microscopist's Note-Book—*W. Lawrence Schroeder, M.A.*	43-44
British Hawkweeds—*W. A. Sledge*	45-46
Additions to 1948 Lepidoptera Report—*E. Dearing*	46
Field Notes and Records	47-48
In Memoriam—Walter Garstang, M.A., D.Sc. (Oxon.)—*H. Henson*	49-50
Thomas Petch, B.A., B.Sc.—*J. Grainger*	50
The Yorkshire Naturalists' Union (Vertebrate Section) Committee for Ornithology Report for 1948	51-75
Notes on the Water Shrew—*Fred Dean*	75-76
The Fungus Foray at Masham—*W. G. Bramley and Jennie Grainger*	77-82
Y.N.U. Bryologists at Austwick—*G. A. Shaw and H. Walsh*	83-84
Book Reviews	42, 76, 82, 85-88

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YORKSHIRE NATURALISTS' UNION

SPURN BIRD OBSERVATORY
WARREN COTTAGE LETTINGS FOR 1949

The Committee desire to have the spring (March to late May) and the autumnal (end July to mid-November) migration periods covered completely by competent ringers. Preference will be given to Y.N.U. members as far as possible. Charges continue at the rate of 3/- per night per person. Will those willing and able to take charge for periods please agree them with the Hon. Secretary as early as convenient, giving, if possible, alternative dates and periods? This will enable those who can give time out of the holiday seasons to make their plans and to fill blanks. Visits by those who are not registered ringers, short period and week-end occupation, etc., can then be arranged for other helpers who should also apply early. Visits are often difficult to arrange at short notice. With six occupants the cottage is considered full.

G. H. AINSWORTH (144 Gillshill Road, Hull),
Hon. Secretary.

NOTICE.

Exchange copies of the following periodicals may be had on loan from The Editor of *The Naturalist*, The University, Leeds 2, on receipt of stamped addressed envelope:

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Complete sets are not available but numerous volumes from 1886-1905, and odd volumes and parts of other years, to 1932, can be supplied at 2/6 per volume or 6d. per part. Copies from 1933 can be supplied at cost price.

APPLY TO

The Editor of the Naturalist, The University, Leeds, 2

THE ENTOMOLOGY OF CHANFUTA TREES

W. D. HINCKS, M.P.S., F.R.E.S.

I owe to Mr. M. G. Fraser, of Formby, the unique pleasure of collecting a number of tropical African insects on a cool and windy English summer's day. Mr. Fraser has a ' nose ' for imported timber and he had ' got wind ' of a consignment of what we understand are Chanfuta trees (*Afzelia* sp.) from Portuguese East Africa, in a timber yard at Halsall, Lancashire. Several living specimens of African earwigs sent by Mr. Fraser made me anxious to examine these trees and it was with pleasurable anticipation that I accompanied him to the Halsall timber yard on July 7th last year.

Here there were six or eight mighty Chanfuta trunks piled up in a corner of the yard, each with its thick and extraordinarily tough bark still intact. So tough indeed was the bark that although we chipped about vigorously with a wooden mallet and a half-inch chisel we left the logs very little altered after two or three hours of strenuous exercise. The outer bark tends to break off in plates rather after the manner of our plane trees. Under these pieces there were a few insects, but the majority were below the bark, on the surface of the wood, where there were patches of moulds, other fungi and Mycetozoa. Generally, however, the bark was very secure and only here and there were we able to effect an entrance and to lever off a few pieces.

Insect life abounded, mostly earwigs and beetles, with a few crickets, ants and bugs. I was so avaricious (not unnaturally) that I used suction tubes to secure the swift earwigs and other insects and overcrowded the tubes so badly that in the ensuing mêlée many of the earwigs and their nymphs lost one or more of the delicately attached terminal antennal segments before I could reach home and kill them.

Fraser was fully occupied in searching for the larvae and adults of Longicorn beetles, some of which, tantalizingly, were visible in borings in the solid wood. My only excursion into his domain was to secure, with his help, a fine specimen of the large weevil *Sipalinus squalidus* Klbe. (see Fraser, *Ent. mon. Mag.*, 85, 1948 : 18) which was enclosed in a cell just below the surface of the wood.

I was primarily interested in the earwigs which were extraordinarily abundant at least in individuals. *Labia ochropus* Stål, a small species common throughout Central and Southern Africa far outnumbered the remaining species. Adults and nymphs in all stages appeared to be quite at home in the cool English climate. As far as I am aware this species has not been recorded outside Africa ; that is to say it is not a cosmopolitan species like its ally *L. curvicauda* (Mots.) of which I took a pair under the Chanfuta bark. The curious *Echinosoma wahlbergi* Dohrn, a member of the primitive family Pygidicranidae, was plentiful, but all the examples taken except one were nymphs. This species has practically the same distribution in Africa as *L. ochropus* and is also limited to that continent. A few small colonies of the Common Earwig, *Forficula auricularia* L., were certainly ' squatters ' under loose pieces of bark.

Most of the beetles taken were small species. Several are probably ordinary ' stored-products ' species which had entered the bark during the voyage. Two Dermestids (*D. peruvianus* Cast. and another), both common as larvae and adults, together with *Necrobia ruficollis* (F.) (Cleridae) *Silvanus bidentatus* (F.). (Cucujidae) and *Tribolium castaneum* (Herbst) (Tenebrionidae) were almost certainly recent colonists of the trees. Two species of *Laemophloeus* (Cucujidae), a small species of *Gnathocerus* (Tenebrionidae) and a strange-looking *Hypophloeus* (Tenebrionidae) doubtfully fall into this category.

A distinct African ' flavour ' was introduced by two flattened Nitidulids. The larger and more plentiful species is pale brown with a narrow black sash, its short elytra exposing several terminal abdominal segments. This is *Leiopeplus rubidus* (Murray) and the other, allied, species is the black, finely pubescent and longitudinally striate *Brachypeplus depressus* Erichs. Single specimens of two small Histerids were taken, one barely half a millimetre long. Three species of Colydiids and three additional Cucujids were present, one or two in some numbers. One of the former looks very like a *Teredus* and another is probably a member of the genus *Endophloeus*. The only Lathridiid was a single *Cartodere* sp. and another minute Clavicorn, unfortunately immature and squashed, is either a *Sacium* or a *Arthrolips* (Corylophidae). Another Tenebrionid, larger than any of the genera

mentioned above, was represented by a single dead example. Several species of *Atheta*-like Staphylinids are interesting, so Mr. Steel tells me. Large numbers of a rather obscure pin-hole boring Scolytid were present on the surface of the wood and a single Ambrosia beetle (Platypodidae) also occurred. Finally, one of the smaller Brenthids (*Pseudoceocephalus* sp.) which I have failed to track down with the aid of a fairly extensive collection of the family, completes the enumeration of the Chanfuta insects.

These cold winter mornings I sometimes wonder how the earwigs now view their English adventure. Or have they long ago succumbed to the rigours of an English winter?

MICROSCOPIC MEASUREMENTS

The late T. PETCH, B.A., B.Sc.

THE use of the micromillimetre and its symbol μ in mycological microscopic measurements is now universal, but the modern mycologist who has occasion to consult publications of the earlier part of the last century must be prepared to find other units of measurement.

Corda, in *Icones Fungorum* (1837-54), gave measurements in decimals of a Paris inch, *e.g. Microthecium zobelii*, 'Long. spor. 0·000740—0·000760 p.p.p.' The Paris inch (pouce) was 27·9 mm.

Berkeley and Broome in their *Notices of British Fungi* did not give microscopic measurements until No. 623 (1852), when they used first fractions and subsequently decimals of an inch. This method, like Corda's, necessitated strings of noughts, but they seem to have passed the printer successfully on the whole, though mistakes have occurred in their conversion into micromillimetres. For example, Berkeley and Broome in their *Fungi of Ceylon* gave the ascospores of *Hypocrea fusigera* as ·003 long, *i.e.* 75μ, but in Saccardo, *Sylloge Fungorum*, that is converted into 7·5μ. As very many of the spore measurements in the *Fungi of Ceylon* begin with three noughts, Saccardo may have thought that this one was a printer's error, or did he consider that no *Hypocrea* could have a spore of that length?

Cesati, in *Mycetum in itinere Borneensi* (1879), used 2μ as the unit, but his measurements were copied into the *Sylloge* as μ, except where the spores had been re-measured by Cooke from Cesati's specimens.

Though the adoption of the micromillimetre was comparatively rapid, it was some time before the use of the symbol μ became general. Perhaps the printer's stocks of Greek characters were limited. Fuckel, in *Symbolae Mycologicae* (1869-75) used the abbreviation mik., while Karsten in *Mycologia Fennica* (1871-78) used mmm. In the last instalment of Phillips and Plowright, *New and Rare British Fungi*, in *Grevillea XIII* (1885), the authors have mill., mm., mk., instead of μ, and even decimals of a mk. The descriptions were drawn up on different occasions, and some of these variants may be due to changing fashions; on the other hand, some may be editorial or proof-readers' emendations. Grove, in *Journal of Botany*, May 1886, commented on Phillips and Plowright's measurement of the spores of *Hypocrea strobilina*, 5—6×5—5½ mm., as 'a size which would be indeed remarkable,' but mm. at that time was one of the contractions in use for micromillimetres. I fell into the same error in *Trans. Brit. Myc. Soc. XVIII*, 54, when citing Patouillard's measurements in *Tabulae analyticae Fungorum* (1883-89), not realising that Patouillard's mm. was micromillimetre.

Phillips used μ for micromillimetre in his *British Discomycetes* (1887).

Norfolk Bird Life, by **Reginald Gaze.** Pp. 7 with 29 photographic illustrations. Jarrold & Sons, Ltd., Norwich, 2/6. Mr. Gaze's little book is sure of a warm welcome in his home county of Norfolk, where he is well known as a lecturer and illustrator. Some of his bird photographs are excellent, particularly his Jay at the nest, a difficult subject. The juvenile Wheatear, which appears to be blind, is less happy, and I feel sure Mr. Gaze must have caught better attitudes of a species so common in his county. The short introductory remarks contain one or two questionable statements, e.g. on the Heron, 'the three blue eggs are very small for a bird of such size.' Minus the legs, wings, and neck, the bird itself is surprisingly small. A number of printer's errors should be corrected in future editions of what is, after all, a delightful little book.—R.M.G.

FROM A MICROSCOPIST'S NOTE-BOOK

W. LAWRENCE SCHROEDER, M.A.

To begin any definite study of Nature, or of man, or of the activities of the human mind, is never an easy thing. Every science has its own set of terms relative to the various phases of its being, and before the student can move with comparative ease in the chosen field of interest, these terms must be put into some sort of relationship with his experience : for the terms that may be used in the description of things and activities will be empty of meaning until they are related with such knowledge as he may possess.

Locke, the philosopher, spoke of the mind as a *tabula rasa*—a clean slate—on which, in experience, the story was written ; but the idea was supplemented by Kant, who urged that the mind itself, by its very constitution, set an order on the experience itself.

Minds are of various makes and qualities : some take to mathematics as a duck takes to water, other minds are fundamentally musical, finding in ordered sound the deepest of satisfactions, others are captured by colour and shape and profoundly desirous of embodying experience in artistic form ; while some minds interpret life in terms of mechanism. So there are men who passionately desire to see more of, and to see deeper into, the forms and activities of life and nature without limiting their work to any specific phase. In the strict sense they can hardly be called ' scientific ' ; they use the microscope as an instrument of delight, and in its manipulation they find abiding joy. Of such is the writer.

The favourite field is pond life, for therein the variety of shape and function is well-nigh infinite. Insect and beetle larvae, the multitudinous forms of algae, the fascinating activities of ciliates and flagellates, the squirmings of nematodes, the spasmodic dances of water-fleas, and the slow deliberate acquisitiveness of hydra, stimulate wonder and minister to satisfactions that are akin to the deeper activities of mind.

I watched a flagellate—*Peranema globulosa*—playing about with an algal spore ; the whip-like flagellum tossed it here and there as if in sport, but presently the spore was caught on the base of the flagellum ; it stuck, and in five seconds it was engulfed.

From a very small lily pond I took, in November, *Phacus anacoelus* Stokes, one of the *Eugleninae*, a border-line alga. Its appearance puzzled me, in that it presented an amoeboid phase. In the same water were numerous *Selenastrum minutum*, *ca.* 8 micra long and 3 micra wide. Some of these had been ingested by the *Phacus*, which at one moment presented the appearance of a longish pointer with a round bulge at the posterior end in which were the ingested algae. The bulge travelled up to the pointer end and back again. In various aspects the creature suggested *Astasia tenax*, also one of the genus *Euglena* ; but a month later I saw the change of form from the pointer-bulge shape to that of the normal *Phacus*, from most of which specimens the green had disappeared ; the tail of the *Phacus* is normally colourless and usually at right-angles to the main body, which is *ca.* 30 micra long and *ca.* 26 micra at the widest part. The nucleus is at the posterior end, and the large *paramylon* grain at the anterior end.

From the same lily pond I took, one September, *Trachelomonas volvocina*, a lively horde. Some, after turning round and round in one spot, came to rest ; then followed a process of splitting ; one break was made, then after two minutes another break, and finally a third, which left the outer case in three fairly equal divisions ; the whole process was over in about six minutes. *Peranema* presented an ingested *Trachelomonas* about one-third of the way from the flagellum and another showed the alga at the end of the body.

One of the most persistent of ciliates is *Paramoecium bursaria* : in almost all of my jars the creature could be found. One jar over seven years old, others almost as ancient, gave it in number. In one dip from the edge of one of the dishes, I counted at least 64 of the green *Paramoecium*. The ciliate is illustrative of symbiosis, the alga being *Chlorella vulgaris*, so that in a sense it is independent of the rest of its world, the exchange of vital elements being secured.

Another very familiar ciliate is *Cyclidium glaucoma*. It is *ca.* 40 micra long, *ca.* 12 micra wide and at the narrowest point *ca.* 6 micra deep. The cilia are from *ca.* 13 to *ca.* 15 micra long, and a terminal spine is at least 16 micra long. The contractile vacuole operated every six or seven seconds, rarely quicker.

A scrape from some steps in a fairly swift-running stream gave water-bears and a very interesting specimen of the *Sarcodina* : *Hyalodiscus*, Hertwig and Lesser. The body is disk-like, with eight stiffish pseudopodia between which is a thin sheet of ectoplasm. *H. rubicundus* has, according to Ward and Whipple, a reddish-yellow endoplasm, but the specimen I took was without colour. It was *ca.* 20 micra in diameter; it had at least two contractile vacuoles, whose operations seemed to succeed each other. The name *Hyalodiscus* is also applied to one of the plankton diatoms.

One of the water-bears, *Tardigarda*—slow steppers—was disengaging itself from a sort of cocoon in which there were four eggs. They are among the more fascinating microscopic objects, with their eight legs they worm themselves in and out of the vegetation, but the moment they are quite free they are helpless, for the smooth glass allows of no foothold and they sprawl here and there in a most amusing fashion.

Species of *Vorticella*, the Bell *animalculum*, of the *Peritricha* order, may be found in almost any collection of pond life, especially where there is any quantity of decaying leaves. On one occasion a strand of spiral tracheides had become detached : in each space between the turns was a *Vorticella microstoma*, over a dozen of them. They were of the same height and apparently of the same mind, for when the cover-slip was tapped they retracted on their stalks, with commendable unanimity. On another occasion I kept a *Vorticella nebulifera* under observation for some considerable time. The contractile vacuole operated about every four seconds, a relatively rapid movement. The mouth pocket, *ca.* 20 micra long, is somewhat egg shaped, but when it is full it moves on, assuming a circular form. The temporary stomachs vary in size from *ca.* 10 micra in diameter to *ca.* 16 micra.

Of abiding interest are the doings of an *Amoeba*. I watched one trying to take in a filament of *Ulothrix*, a stiffish green alga. The *Amoeba* wrapped itself about the filament, but when it realised that both ends protruded it withdrew from one end and for a time rested content with the encirclement of eight of the cells of the alga. Then having decided to retreat, it disengaged itself completely from the *Ulothrix*. The entire operation lasted two minutes.

On one occasion I had three species of *Amoeba* and one variety on the same slide : *A. proteus, A. verrucosa*—a very slow-moving creature—*A. guttula*, and a variety of *A. proteus, granulosa*, with short pointed pseudopodia capable of extension. In circular shape it was *ca.* 36 micra in diameter. An *Amoeba guttula*, full of refractive granules, and maintaining a fairly constant shape, moved without haste across the slide. The contractile vacuole remained open for from 25 to 35 seconds ; it closed very slowly and not with a bang and remained closed for *ca.* 20 seconds. The *Amoeba* was *ca.* 30 micra long and *ca.* 12 micra wide.

Rotifer vulgaris, whose length when extended may be over 400 micra, is often seen. It is capable of taking in filaments over 20 micra long. I saw one young rotifer within its mother ; the mastax was working and the two red eyes were clearly seen. Another creature had an embryo almost ready for birth. On one point I would diffidently ask for confirmation or refutation. Does the *Rotifer* anchor itself by its toes or by the circular pad at the end of the body? To me the latter is the answer.

I watched a close relative of *R. vulgaris*—*Philodina roseola*—feeding on *Chlamydomonas*. The alga was caught on the oral cilia, turned over and over, as a juggler plays with balls on a stick, and more often than not rejected as too large ; one *Chlamydomonas* stuck in the passage to the mastax. In one case, however, a rotifer had taken in more than a dozen of the algae ; several had passed to the lower end of the body where they looked as if unaffected by digestion processes, but the disintegration could not long be delayed.

I have previously referred to a jar which originally held collections taken in Leeds before 1938. *Nitella* and *Nostoc* emerged in the course of years. Recently I cleared the jar of an over-plus of algae and examined the plant debris which had collected at the bottom of the jar. There was a surprising number of the small red crawling mite, hundreds of them moving in and about the *Nostoc* and debris. Ward and Whipple have a note on it as belonging to the *Oribatidae* or horny mites and probably of the genus *Notaspis*. It is a crawler and unable to swim. Needless to add, *Bursaria vernalis* the green *Paramoecium*, was also in number.

BRITISH HAWKWEEDS

W. A. SLEDGE

The Hawkweeds have long been notorious for the bewildering multiplicity of their forms. They are indeed the supreme example amongst flowering plants of the taxonomic complexity which results from the wholesale origin of apomicts in a plastic genus naturally rich in species. Descriptions of various taxonomic units have continued to accumulate with ever-increasing rapidity since the time of Linnaeus, and already, twenty-five years ago, when Zahn's monumental monograph was completed, no less than 18,000 names were listed in its index.

In Britain the Hawkweeds have engaged the attention of some of the most experienced and able field botanists, and successive accounts and lists have seen the same mounting regiment of names. The younger James Backhouse first monographed the British *Hieracia* in 1856 and recognised 33 species. In the latter part of the nineteenth century and early in the present century, Hanbury, Ley, Marshall, the Linton brothers and others collected assiduously and wrote numerous articles on Hawkweeds, attempting to bring the rapidly accumulating knowledge of British forms into line with that of contemporary Scandinavian students of the genus. In W. R. Linton's monograph published in 1905, the number of species had risen to 124. Twenty years later the eleventh edition of the *London Catalogue of British Plants* was issued in which the number of *Hieracia* accorded specific rank had exactly doubled. The list of Hawkweeds in this work was based on Zahn's recently completed monograph and included all the names of plants referred to by Zahn as occurring in Britain. But the absence of descriptions in any British Flora for the host of new names thus introduced discouraged further study and in the last 20 years the genus has been virtually neglected by British botanists.

Mr. Pugsley's interest in Hawkweeds, which he studied both in the field and in his garden, was of long standing. He began his account of the British Hieracia (*A Prodromus of the British Hieracia*, by H. W. Pugsley. Journal of the Linnean Society of London, Botany. Vol. 54, September, 1948. Pp. iv+356 with 17 plates, 60*s*. net) in 1936 and had made good progress before the war interrupted the work. It was, however, despite increasing difficulties, completed before the end of the war and at the time of the author's death in November, 1947, much had been read in proof.

The work describes 260 species and many varieties distributed in 17 sections. The descriptions are concise and followed by notes on points of interest and distributional data. Seventy-two new species are described, excluding 21 originally described under a different rank which are now raised to full species. Many new varieties are also added. Of the 249 species of Eu-Hieracium no less than 180 are thought to be endemic. The systematic section is preceded by an introductory account of the history of taxonomic investigations of the genus, its morphology, classification, and behaviour in cultivation; and the work concludes with an analysis of the distribution of the species in Britain and discussion of their geographical affinities and origins. In this discussion it is shown that a relationship exists between the Hawkweeds of Southern Britain and Central Europe pointing to an origin from this source, probably *via* France and prior to the opening of the Straits of Dover. The far richer Hawkweed flora of Scotland and Northern England, on the other hand, shows an affinity with Scandinavian species, indicating a probable origin from this source whilst the greater number both of species and endemics in Northern Britain is held to suggest that the Scandinavian immigration was the earlier of the two.

Of the many important systematic works written by Mr. Pugsley this is the most considerable. His ripe experience is manifest in the masterly way in which he has organised his wide and critical knowledge of this perplexing group; and the comprehensive nature, thoroughness of treatment and skilfully drafted descriptions and comparisons compel admiration. That it will stimulate renewed interest in these plants is certain, for one of the defects of Linton's monograph was the absence of keys to the species, and their provision in this work will be an added encouragement to students to embark on the seas of diagnosis. That their passage will not be smooth, however, or their destination always correctly achieved seems equally certain. Indeed, when the writer attempted to name an unknown Hawkweed he reached no destination at all, but lay becalmed without

APR 28 1949

any decision being reached even as to which of the 17 sections it belonged. And though this may well be an admission of his own limitations and inexperience the difficulties of the student are implicit in the author's admission that ' an infinity of cross-affinities is produced and the series of transitions in different organs give rise to an indefinite number of combinations of characters which renders it generally difficult to define accurately either large or small groups throughout the genus.'

This raises anew the whole problem of the systematic treatment to be accorded to such apomictic complexes. However much cytogenetical ecological or geographical data influence views on taxonomy, in delimiting taxonomic units morphological considerations must remain of primary importance since species have always been conceived and described in morphological terms. The method of assigning names to all populations of individuals which are morphologically distinct from other populations is therefore logically defensible. But where excessive polymorphism leads to the selection of specific characters from ' an infinity of cross-affinities ' the choice of the characters to which primary importance is given becomes increasingly arbitrary and an expression of personal opinion. Any future taxonomist who has the time and inclination to pursue the study of Hawkweeds on the same lines may well arrive at conclusions which differ as much from those of Mr. Pugsley as his do from those of his predecessors. And who shall say which is nearest the truth? It is, moreover, largely because of the problematical relationships of the forms to one another in this and other apomictic groups that the convention has been adopted of assigning pseudo-specific rank to units which are admittedly not homologous with the species of amphimictic groups. In practice, then, this method only gives satisfactory results when applied to groups of obligate apomicts which are comparatively few in number and separated by relatively clear differences. In such protean genera as *Hieracium* a sound basis for a satisfactory understanding and treatment can only be obtained through a detailed knowledge of the rôle played in their evolution by polyploidy, hybridisation and apomixis ; and the illuminating results which cytogenetical and experimental studies have yielded in other critical genera (Babcock's work on *Crepis* being an outstanding example) emphasise our ignorance of this aspect of the *Hieracium* problem. The application of these modern methods of analysis to so large and complex a genus may well deter investigators, but it is only along these lines that we can eventually hope for anything approaching stability in its classification.

Mr. Pugsley's awareness, however, of the limitations of our present knowledge is implied in the choice of *Prodromus* rather than *Monograph* for the title of his work. He has ably systematised a great fund of knowledge about the forms of British Hawkweeds which no other man possessed, and it is for others to take up the study and evaluate this knowledge in the light of new approaches to the problems they present. As such it is a notable achievement and a fitting culmination to the many important contributions made to the study of the British flora by a distinguished amateur botanist.

Additions to 1948 Lepidoptera Report—The following notes have been communicated by Messrs. F. Hewson (for the Bradford Natural History and Microscopical Society), M. D. Barham, and S. M. Jackson, of Selby.

Lithosia deplana Esp. 26/9/48 at Gateforth, near Selby—first time in this district.—S.M.J.

Amathes glareosa Esp. One taken at Selby—not common there.

Leucania pudorina Schiff and *Lacanobia suasa* Schiff. taken at Skipwith, 1/7/48.

Polychrisia moneta L. Larvae eaten by sparrows, Little Horton, Bradford—J. Briggs.

Hydrochroa syringaria L. 20/5/48, Selby—first for many years.

Agapetes galathea L. One at Keld Head, Pickering, 31/7/48.—M.D.B.

Celastrina argiolus L. Eldwick, Bingley, 12/5/48 ; Shipley, 16/5/48 ; first brood common at Pickering and Thornton Dale, 17/5/48.—M.D.B. ; both broods common at Selby, larvae on Ivy in autumn.—S.M.J.

Erynnis tages L. More common than ever seen before in May at Selby.

Aegeria tipuliformis Cletck. 22/6/43, Shipley (J. A. Wilson).—E. Dearing.

FIELD NOTES AND RECORDS

The Glabrous White Campion (see *The Naturalist*, April-June, 1948, pp. 45-46)—Dr. Nils Hylander, of Uppsala, has kindly drawn my attention to an earlier name for this plant, viz. : *Melandrium album* (Mill.) Garcke var. *viscosum* (F. Aresch.) Ahlfvengren in Neuman and Ahlfvengren, *Sveriges Flora*, p. 524 (1901). This was based on *M. pratense* (Schk.) Roehl. γ [apparently var.] *viscosum* F. Areschoug, *Skänes Flora*, ed. 2, p. 256 (1881). Areschoug gave his plant the following description (kindly translated by Mr. W. C. Worsdell) : '. . . entire plant smooth ; stem below the nodes, also the flower-buds, sticky . . . found only once at Lund.' The name also appears in Dr. Hylander's list of Scandinavian plants as *M. album* (Mill.) Garcke f. *viscosum* (F. Aresch.) Ahlfvs,. see Hylander, *Förteckning över Skandinaviens växter, utg. ar Lunds botaniska förening*, I. *Kärlväxter*, p. 51 (Lund, 1941). This list was not in the Kew Library when I wrote my note on the Glabrous White Campion, nor was the second edition of Areschoug's *Skänes Flora*, an important book more than twice the size of the first edition and evidently rare in Britain. Copies of both works have now been procured for the Kew Library. There can be no doubt that Areschoug's description fits very well the British specimens which were the subject of my note, and his epithet must be adopted for our plant unless an earlier one is discovered. The type of the later epithet *glabrum*, for which I made a new combination, is, of course, De Vries' Dutch gathering. I have seen neither this nor its progeny, so must only suggest what is probable, that the name should be treated as a synonym of var. *viscosum*. My Chiswick colony has unfortunately been destroyed by the bulldozer ,but a single plant was again seen last summer at Ham pits, Surrey.—N. Y. Sandwith.

***Dicranum montanum* Hedwig in Yorkshire.**—When working down the west side of the Wharfe between Barden Beck and the Strid, Bolton Abbey, V.C. 64, on 20th February, 1949, an odd bit of a small moss about the size of *Dicranoweisia cirrata* was gathered from a tree. On examination at home I could only run this down to *Dicranum montanum* Hedw., and this was confirmed by referees of the Brit. Bryol. Society. As I was not certain of the exact locality I paid another visit a week later and located the moss on the sloping trunk of a living beech tree at the Strid. While a casual glance in the field might pass it by as *Dicranoweisia*, it is of a much brighter green and less shining than that moss, whilst under a strong lens the denticulations in the upper part of the leaf at once separate it. The leaves are strongly crisped when dry. Dixon's note on the margin being often minutely denticulate almost to the base by the projecting transverse walls of the cells is well borne out by my specimens.

Mr. J. B. Duncan tells me it is rare in the north, but more frequent in the Midlands.—G. A. Shaw.

***Weisia tenuis* C.M. in East Yorkshire.**—Records of Yorkshire bryophytes appearing in the British Bryological Society's *Census Catalogue* unfortunately do not always agree with the published records of the Yorkshire Naturalists' Union. One of these differences concerns the moss *Weisia tenuis* recorded in the *Census Catalogue* (1926) for V.C. 61 but not included in the Yorkshire records. Mr. R. Lewis informs me that in September, 1948, he found in St. German's Churchyard, Winestead, near Patrington, S. Holderness, what appeared to be an old font with a small moss growing in the bowl. Uncertain of its name, the moss was sent to Dr. E. F. Warburg, who identified it as *Weisia tenuis* C.M., and as the original B.B.S. record could not be traced, its presence in V.C. 61 can now be placed on a more satisfactory basis. Normally the moss is said to grow on inclined faces of sandstone or calcareous rocks.—H. Walsh.

East Riding Hepatics.—During November, 1948, *Anthoceros punctatus* (L.) was found in a field between Cottingham and Beverley, the map reference being 99/025,358. The plant was locally abundant and was associated with *Riccia glauca* L. and *Fossombronia Wondraczeki* (Corda) Dum. So far as we are aware, *Anthoceros* has not been recorded previously in this Vice-county.

Later in the same month *Ricciocarpus natans* (L.) Corda was found covering a considerable area of water in the lake at Rise Park. We think that this record may also be of interest.—Gordon Dolman and John Webster.

Gannets off the Coast near Scarborough in December.—During a walk from Filey Brigg to Cayton Bay on December 27th, 1948, thirteen Gannets (*Sula ba-sana*) were seen between 11 a.m. and 3-30 p.m. All of them were very close to the shore, enabling the yellowish colouring of the head to be seen with ease. All except two were, apparently, in adult plumage, the others showing a good deal of black on the wings, but being white about the body. Seven were flying south as steadily as a stiff southerly wind would permit ; two were flying north ; and four were watched for some half-hour as they fished within 30 to 40 yards of the rocks off Yons Nab, just south of Cayton Bay. These birds flew back and forth along the line of the rocks which occur just off the point, and were fishing constantly whilst under observation. From the cliff top it was not possible to judge the height of the dives made, but they did not appear to be from any great height. No bird was seen to bring food to the surface, but it was observed how buoyant they are as they come to the surface, birds occasionally ' bouncing ' clear of the water as they surfaced.—A. J. Wallis, D. Wheatley, and B. Wood.

Little Auks at Filey Brigg.—On November 7th, 1948, during a visit to Filey Brigg, considerable numbers of Little Auks (*Alle a. alle*) were observed. During the whole of the morning small parties of up to 30 birds were seen flying past, or swimming on the sea. The majority came from across Filey Bay, and crossed over the Brigg heading north. They flew quite low and often passed within two or three feet of our heads. Those seen on the water did not seem at all distressed, and took wing without any difficulty. None were found stranded on the rocks, as so often occurs during visits of this species to our shores. The only other record made at this time was three birds seen flyng north past the Marine Drive, Scarborough, on the following day. This is the second earliest date on which Little Auks have been recorded in the books of the Scarborough Field Naturalists' Society, birds being seen as early as October 9th in 1921. The weather at the time was cold with a strong wind from the east.—A. J. Wallis, D. Wheatley and B. Wood.

(From November 7th to 11th inclusive no fewer than seven Little Auks were found in the West Riding, dead or dying.—R.C.)

Blackcap near Harrogate in January.—On January 29th of this year, the Rev. K. Ilderton and his brother had brief views of a cock Blackcap (*Sylvia atricapilla* L.) near a stream draining two lakes in a well-wooded area near Harrogate.

On January 30th, a mild sunny day, I visited the same locality and saw a cock Blackcap, doubtless the same bird as was seen on the previous day. I watched it for about half an hour in bright sunshine at distances ranging from 4 yards to fifteen yards through binoculars and a $\times 25$ telescope, noting the black forehead, crown and nape, olive-grey mantle and back, and pale-grey breast and belly.

The bird spent most of its time on the ground in the corner of a field near the tree-bordered stream, making frequent sallies after passing insects which the sun had brought out in quite good numbers. Jumping up from the grass, the bird would catch a fly in mid-air, or run rapidly over the short grass to capture some small insect. When feeding round some horse dung, it was particularly active, jumping time after time into the air for the very small flies it disturbed. Unfortunately, I was unable to obtain any of the insects on which it was feeding, but I believe they were small gnats or other diptera.

In the corner of the field was a wood trough where a horse was fed daily on oats, and the Blackcap made frequent visits to this trough, flying to it to perch on the edge for a second or two, and then dropping down into the trough and remaining out of sight for several seconds before reappearing and returning to its flycatching. Later examination showed that there were a few grains of oats in the trough, and although I did not actually see the bird eating the grains, it is extremely likely that this took place. Chaffinches, Great and Blue Tits also visited the trough whilst I was watching the Blackcap.

Visits were made to the area on February 1st, 13th, 20th and 27th, but the bird was not seen again. Prolonged frost from February 3rd to 7th may have affected the bird.

The only other recent records for this species wintering in Yorkshire are one dead bird near Whitby in January, 1943, and one in a garden near Scarborough for ten days from December 26th, 1943.—A. G. Walker.

In Memoriam

WALTER GARSTANG, M.A., D.Sc.(Oxon.)
(1868-1949)

The death of Professor W. Garstang at Oxford on February 23rd has brought much sincere regret to all who knew him. Of international reputation as a zoologist, he brought to his immediate associations a charm of manner, an appreciation of culture and a refinement which quite often masked the fact that his serious intellectual pursuits were scientific.

Entering Jesus College, Oxford in 1884, he had graduated at twenty and begun a career of high productivity as a marine biologist at Plymouth. With a short

break in 1891-92, when he was at Manchester, he remained at Plymouth until 1893, making special studies of marine mollusca and tunicata, in the latter group especially he soon became a world authority.

After returning to Oxford for four years, as Lecturer in Zoology and Fellow of Lincoln College, we find him from 1897-1902 once more at Plymouth, this time specialising in fishery investigations. Continuing the same line of work at the Fisheries Laboratories at Lowestoft (1902-07), he wrote many valuable papers on fish and fisheries. In particular his publications on the plaice are classics and have laid the foundations for much of the work of more recent years.

In 1907 he succeeded Professor Miall as Professor of Zoology in the University of Leeds, a post he held until his retirement in 1933. It was now, of course, that the North began to make his acquaintance and to respect and admire him. Mixing freely with all genuine students of his subject, young or old, amateur or professional, his intellectual power and charm of manner made his company a delight. A foible which friends sometimes found irritating and strangers exasperating was a disinclination to answer letters—yet a correspondence on a purely academic

subject was a pleasure to him and pen would go to paper three or four times a week for such a purpose. After all, as he used to say, most letters do answer themselves if left long enough.

After 1918 a marked change in his zoological interests becomes apparent. It was this year that saw him President of the Yorkshire Naturalists' Union, delivering a presidential address of a general kind on 'Nature and Man.' This was the first of his writings betokening a rapidly widening interest in terrestrial natural history and a rapidly developing artistic appreciation of nature. His own words, 'pursuing Beauty you may miss Truth, and serving Truth you may fail in Beauty,' are pregnant with meaning, but the source of that realisation, though perhaps known to more intimate friends, is hidden from the writer. It may have been that the hideousness of the war and the gaps in the ranks of young zoologists dear to him by contrast brought the beautiful things of the countryside much closer to him. His purely lyrical works, the 'Songs of Birds,' and 'Three Songs and a Sonnet' and many more are all lovely combinations of Truth and Beauty. The 'Students Opera' was surely a joyous production in the handling of a new found gift and the exploitation of a more than competent technique.

To his formal natural history—he rapidly acquired great skill as a field ornithologist and entomologist—he brought a most unusual poetic appreciation which, however, did not for one instant overshadow a penetrating faculty of observation or an uncompromising capacity for intellectual analysis. Walter Garstang was too good a scientist to be led away by his muse.

Almost all of his serious scientific work is permanent and much will not be outmoded for many years. His publications on the tunicata, on marine fisheries, and on the theory of recapitulation stand as a record of a life well lived in the service of the subject he professed; the affection of his students, the deep regard of his friends equally point to a life well lived as a kindly, sympathetic, highly-cultured English gentleman.

H. Henson.

THOMAS PETCH, B.A., B.Sc.
(1870-1948)

Serious students of mycology, particularly those in Yorkshire, cannot examine specimens of *Nectria* or *Melanospora* without thinking gratefully on the name of Petch. His *British Hypocreales* and *British Nectriodeae* were studies undertaken largely to meet the plea of the Yorkshire Naturalists' Union's Mycological Committee that there was no exact information on these groups. The great labour involved was cheerfully undertaken to help his colleagues, for he was a friendly man, with kind common sense, patient with the student, erudite without ostentation.

He was known in a wider sphere for his work on entomogenous fungi, a little-known section of mycology which he elevated to greater importance. A foray for him was not the usual more or less extensive survey, but a meticulous examination of a small area, which certainly produced good results. In a still wider field, having been Government Mycologist in Ceylon since 1905, Mr. Petch launched the Tea Research Institute there in 1925, and became its first Director. Monumental works of this period are *The Physiology and Diseases of Hevea brasiliensis* (1911) and *The Diseases and Pests of the Rubber Tree* (1921), which placed him as the world's leading tropical mycologist of the period.

A Yorkshireman, born at Hornsea and educated at Hedon and Hull, Tom Petch came under the influence of the late Dr. C. B. Plowright, whose daughter he married in 1908. He retired from Ceylon in 1928 to live at King's Lynn, but was until a few years ago a frequent visitor to Y.N.U. meetings. He was a regular contributor so *The Naturalist* in which he published many important papers and his last note appears elsewhere in this issue. The British Mycological Society elected him President in 1920 and later made him an honorary member, and the Yorkshire Naturalists' Union chose him as President in 1931. He died at North Wootton, King's Lynn, on December 24th, 1948, at the age of 78. What better consolation can we offer Mrs. Petch, her son and daughter, than to assure them that his work remains a standard and his personality is remembered kindly and with gratitude?

J. Grainger.

THE YORKSHIRE NATURALISTS UNION (VERTEBRATE SECTION)
COMMITTEE FOR ORNITHOLOGY

Chairman : R. M. Garnett.

Recorders :

North Riding : R. M. Garnett, Thornton-le-Dale (East), and J. P. Utley, B.Sc., Brompton (West).

East Riding : G. H. Ainsworth and J. Lord, M.Sc., 144 Gillshill Road, Hull.

West Riding : R. Chislett, Masham, nr. Ripon.

York District : E. W. Taylor, M.B.O.U., 11 The Avenue, York (1948), J. Lord, M.Sc., 68 Wetherby Road, York (1949).

Hon. Secretary and Editor of Records :
Ralph Chislett.

Report for 1948.

Since the end of 1939, when I undertook, not too lightheartedly, the task of co-ordinating into one yearly report all records of Yorkshire bird-life available in each year, I have kept in mind the eventual production of a volume that would trace the county history of birds from the time when the late T. H. Nelson wrote his *Birds of Yorkshire*. It was my hope that I should be able to essay the further task myself. The hope receded during World War II, but has revived lately. In any event I have continued to gather material together in the belief that it would be available for someone. During the past year some progress has been made with the project ; and I am hopeful that a year hence the end may be in sight. The continued march of events soon begins to cause histories of any kind to become ever more incomplete. With the larger number of working observers this is truer of natural history to-day than ever ; and of national history too.

Among the species whose history and status in Yorkshire have been already reviewed from 1906 to date are several concerning which more information of present status and distribution is needed. Such are : the Twite, whose breeding now seems to be very local, almost confined to a few scattered colonies, whereas Nelson indicated a much more general distribution in moorland areas ; the Grasshopper-Warbler, yearly reported from many places, but of which breeding records are very few ; the Stonechat, here one year, gone the next, with so much suitable ground still available on which it has bred in past years ; the Red-backed Shrike, now extremely casual in its occurrences, with no very recent proof of breeding ; the Woodlark, which is known to have bred recently in one area, but which Nelson reported to be more general in his time ; and the Long-eared Owl. If observers would make an effort with those species in 1949, so that their status as breeders may be known accurately in that year, they would be very helpful.

The weather in 1948 was in no way remarkable, with no very severe spell, with many showery periods but no great weight of rain, and with only one short hot period at the end of July into August. There seemed to be nothing to affect birds very seriously, as we can see in the partial recovery to varying degrees of the species affected most adversely by the severity of early 1947. It was too little petrol, not too much rain, that affected attendances at some of the Y.N.U. field meetings ; nevertheless we were represented at all, and officially at most.

Our meetings in March and October were well attended and had excellent after-business programmes. In March, Capt. G. K. Yeates delighted us with his slides and descriptions of ' The Birds of the Île de la Camargue.' In October Mr. Ian Appleyard showed excellent colour photography of birds in their haunts in several parts of Britain, and had evidently intensively studied the Dipper. The Annual Meeting of the Union at Scarborough in December was largely an ornithological event this year ; and many had come from distant parts of Yorkshire to hear Mr. Alexander's Presidential address—' Bird Observatories and Migration ' which has now been published in *The Naturalist*. The absence of the genial Hon. Secretary, Mr. Cheetham, caused by a serious accident, was much regretted by all.

Details of several of the more important events of the year have already been published in *The Naturalist* and in *British Birds*. In such cases space can be saved in this report by a brief mention of the facts, readers being referred to the magazines concerned for fuller details.

The Spurn Bird Observatory Sub-Committee.

R. Chislett (Chairman), R. M. Garnett (Representative to the Bird Observatories Sub-Committee of the B.T.O.), C. E. A. Burnham, J. Lord (Hon. Treasurer), and G. H. Ainsworth (Hon. Secretary).

Estimates of birds present along the promontory were recorded on 153 days : the ringing-trap was operated on a number of additional days. The main migration periods were covered in both respects, the only almost blank periods being from January 10th to March 26th, parts of June and July, and from November 14th to the year end—ringers were present on occasional days in those periods. Many gave generously of their time to the service of the Observatory, equivalent to a month or longer in the cases of G.H.A., R.F.D., A.L.C., and R.C., and to a fortnight or longer in the cases of G.R.E., R.M.G., T.B.D., E.H., E.C., A.M., H.G.B., R.B. Many more served for varying shorter periods. All felt they were working co-operatively in a common high cause. It is hoped again in 1949 to have an expert ringer in charge through the more important periods ; but this is only possible if bookings for the cottage are early ; if otherwise the few on whom we rely to complete the programme may have made other arrangements before the periods for which they are needed at Spurn are known.

In the ringing year to October 31st, 763 birds were ringed of 43 species, including 735 trapped adult birds and 28 nestlings or walking young ; a total increase over 1947 of 123 birds. Most of the increase was achieved in the spring. In autumn, south and westerly winds ruled for long periods, and busy times at the trap were few and short, with the result that although the previous best numerical record for birds ringed in a day (27) was passed on three days (57, 56 and 45), there were long periods in which passerine birds were scarce.

Numbers of species ringed have varied considerably, with many more Willow-Warblers, Goldcrests, Linnets, Chaffinches and Blue-Tits than in 1947, and considerably fewer Blackbirds, Greenfinches and House Sparrows. The full list comprised : Willow-Warbler, 93 ; Goldcrest, 80 ; Chaffinch, 64 ; Linnet, 61 ; Whitethroat, 61 ; Blackbird, 47 ; Robin, 45 ; Starling, 36 ; Greenfinch, 32 ; Pied Flycatcher, 26 ; House Sparrow, 26 ; Blue-Tit, 23 ; Redstart, 18 ; Swallow, 18 ; Sedge-Warbler, 11 ; Song-Thrush, 10 ; Spotted Flycatcher, 9 ; Great-Tit, 8 ; Wren, 8 ; Hedge-Sparrow, 8 ; Sand-Martin, 7 ; Garden Warbler, 7 ; Yellow Bunting, 7 ; Reed Bunting, 6 ; Redwing, 5 ; Cuckoo, 4 ; Whinchat, 4 ; Brambling, 4 ; Lesser Whitethroat, 4 (including one Siberian), Meadow-Pipit, 3 ; Wood-Warbler, 3 ; Black Redstart, 2 ; Skylark, 2 ; and one each of Blackcap, Nightingale, Jay, Barred Warbler, Yellow-browed Warbler, Willow-Tit, and Great Grey Shrike. Young of Ringed Plover (9) and of Little Tern (4) were also ringed. Many of the more interesting details are referred to in the ' Classified List.'

The second trap near to the Point is nearing completion. The hutments around the cottage are down and awaiting removal, after which it is proposed to erect a fence and to plant much of the ground inside it with bushes designed to attract birds.

For the Observatory library, to complete the set, volumes of *The Naturalist* for 1876, 1877, 1878, and 1940, and the parts for October 1893, February 1939, and April-June 1945, are needed.

The Hon. Secretary and the Sub-Committee wish to express their thanks for the practical interest shown in our work by W.D. Northern Command ; especially to Mr. H. V. Pottage of the Lands Branch at York ; to the D.C.R.E., Major Berry ; to the Garrison Engineer, Mr. Batchelor ; the Clerk of Works, Mr. Iveson ; and to the Officers in charge of the Spurn defences. Thanks are also due to the many visitors who have sent gifts, have renewed breakages, left the cottage clean and tidy, and taken care not to damage shrubs and trees. The election of G. H. Ainsworth to the Presidency for 1948 of the Vertebrate Section of the Y.N.U. was a richly deserved acknowledgment of the debt we all owe to him.

The High Royd Ringing-trap of the Halifax Zoological Group.

Under the leadership of G. R. Edwards, 502 birds were ringed in 1948, covering 31 species, as against 325 in 1947. Included were : Pied Wagtail, 88 ; Blue-Tit, 63 ; Willow-Warbler, 61 ; Meadow-Pipit, 56 ; Hedge-Sparrow, 33 ; Robin, 31 ; Yellow Wagtail, 31 ; Great-Tit, 27 ; Chaffinch, 16 ; Blackbird, 14 ; House-Sparrow, 12 ; Tree-Sparrow, 11 ; Moorhen, 9 ; Whitethroat, 7 ; Common Sandpiper, 6 ; Rook, 5 ; Song-Thrush, 5 ; Wren, 4 ; Greenfinch, 3 ; Yellow Bunting, 2 ; Redstart, 2 ; Linnet, 2 ; Starling, 2 ; and one each of Swallow, Mistle-Thrush, Sedge-Warbler, Magpie, White Wagtail, Grey Wagtail, and Green Sandpiper. Five young Lapwings were also ringed.

The list shows what can be done about a sewage farm by a river (Calder) side. It includes many more passage migrants than breeders in the immediate locality.

The fine weather of early spring caused many birds to pass direct to their breeding grounds higher up the valley, and some of them were recorded there before being seen at High Royd. Three days of rain in late April brought the first Sandpipers, and four White Wagtails for a few hours stay. In contra-distinction the later summer was cold and showery; and during the period July to September 390 birds, awaiting better migration conditions, were caught, as against 109 in the same period of 1947. Reference to matters of special interest will be found in the 'Classified List.'

Bird Boxes in the Forests of N.E. Yorkshire.

Mr. Garnett reports that the open winter was beneficial to the depleted numbers of resident Tits, enabling them to occupy boxes so early in the spring before the arrival of the summer visitors. 109 boxes were added, but as in 1947 the result of introducing boxes into one forest was negative.

Of 178 boxes, 34·8% were occupied, a slight decrease probably due to the increase in number of boxes, which in new areas are not discovered by the birds in the short interval between erection and breeding time. Tits occupied 20·8%, Pied Flycatchers 12·9%, and Redstarts 1·1%. Six pairs of Blue-Tits occupied boxes in coniferous plantations, but mixed and broad-leaved areas remain far more popular, and have evidently not reached saturation point.

395 young birds were colour-ringed in red, 78 Great-Tits, 160 Blue-Tits, 27 Coal-Tits, 115 Pied Flycatchers, and 15 Redstarts. Mr. Mackenzie, who supplied the rings, paid a visit of inspection on May 31st.

Clutch and brood sizes, tabulated for the B.T.O., are of interest:

	Nests.	*Average size of clutch.*	*Average size of brood.*
Great-Tit	8	10·25	9·75
Blue-Tit	17	10·17	9·82
Coal-Tit	3	9·66	9·00
Pied Flycatcher	19	7·42	6·84
Redstart	2	7·50	7·50

Two Pied Flycatchers, ringed in 1947, and seen again in 1948, are referred to in the 'Classified List.'

With the end of 1949 I shall have completed ten years of distinctly active service to the Y.N.U. and to Yorkshire field ornithology. Y.N.U. matters have had preference over my own work. I have tried to reach high standards of accuracy and of friendly co-operation such as were always set by the late H. B. Booth. If the volume on Yorkshire birds to which I referred in the beginning is then in sight of completion, perhaps the Committee will consider the end of the tenth year to be a convenient time for another, or others, to endeavour to advance on my performance.

It would be impossible to produce this report without the generous help of my colleagues, the Recorders for the North and East Ridings and the York District, and of a host of contributors, to all of whom I tender my sincere thanks.

In the following list of those who have contributed material for this report are included those who have done so through the books of the Spurn Bird Observatory:—G. H. Ainsworth, J. Akroyd, W. B. Alexander, F. R. Allison, E. W. Aubrook, H. E. Adamson, B. Astin, P. Baldwin, A. Baldridge, Miss S. Barras-Smith, M. Barras-Smith, H. W. Bracken, J. E. Beckerlegge, D. F. Beckett, W. Bennett, Lord Bolton, W. G. Bramley, Bradford N.S., P. W. P. Browne, R. Bramhill, H. G. Brownlow, H. O. Bunce, C. E. A. Burnham, J. P. Busby, E. B. Burstall, L. Broome, K. Brown, R. S. P. Bates, J. J. Boon, J. H. Boardman, B. Bussey, A. D. Bateman, L. Carr, J. A. Chadwick, C. A. Cheetham, R. Chislett, Mrs. A. L. Chislett, Miss E. Crackles, V. S. Crapnell, K. C. Crosbie, S. Cockroft, J. Cudworth, B. Dale, P. E. Davis, K. Dawson, F. Dean, R. F. Dickens, T. B. Dean, M. Darlow, G. Dent, G. R. Edwards, P. Edwards, J. C. S. Ellis, S. Eastwood, N. F. Ellison, W. F. Fearnley, K. Fenton, W. Flesher, J. A. Forder, H. Foster, B. Foggitt, J. H. Elliott, R. M. Garnett, R. F. Graham, F. C. Griffith, J. S. Griffith, W. Greaves, P. Gravett, A. Gordon, M. B. Harvey (*Gamekeeper and Countryside*), P. F. Holmes, E. Holmes, J. D. Hartley, Halifax Zoological Group, D. Hirst, A. Hazlewood, R. Hewson, P. A. Humble, O. C. Hill, J. H. Howe, M. Hardy, G. E. Hyde, Miss M. Hutchinson, W. H. W. Inman, K. Ilderton, S. Jackson, F. Jefferson, K. M. Lewis, Miss E. P. Leach, D. Leaver, C. Lilleyman,

J. Lord, C. W. Mason, H. Marjoram, A. McAllister, I. Morley, M. F. M. Meiklejohn, F. Murgatroyd, F. C. and H. N. Niven, A. Mitchell, F. Newton, D. A. T. and K. T. Morgan, Miss M. Mackenzie, J. M. McMeeking, J. B. Nicholson, C. Oakes, M. R. K. Plaxton, R. M. C. Potter, A. G. Parsons, H. J. R. Pease, A. Pilkington, C. F. Procter, G. R. Pryor, L. Robinson, Miss J. Ridgway, Hon. Mrs. R. Russell, W. Ramsden, E. M. Rutter, Mrs. E. Rimmington, Miss B. Singleton, H. Spencer, R. Slater, B. Speake, T. Smith, A. R. Summerfield, E. W. Taylor, A. Thompson, C. F. Tomlinson, G. W. Temperley, R. Tottie, A. F. Taylor, J. P. Utley, D. Utley, D. C. Urquhart, D. I. T. Walker, Miss J. Walker, A. B. Walker, A. G. Walker, D. F. Walker, J. R. Waites, A. H. White, E. W. Watson, A. A. K. Whitehouse, H. J. Williamson, E. Walker, A. J. Wallis, E. A. Wallis, R. Wagstaffe, Wakefield N.S., D. Wheatley, Wharfedale N.S., A. Wood, B. Wood, H. F. Woods, E. Ward, C. H. Wells, R. Whitlock, R. F. Wormald, F. Wilcock, K. Wheater, G. K. Yeates, P. Young, Miss Joyce Yeomans.

The numbers preceding the names of species that follow are those employed in *Witherby's Handbook of British Birds*.

CLASSIFIED NOTES.

1. Raven.—Birds were seen on several dates above Upper Teesdale, Swaledale, Wensleydale, and in Craven. From a nest in which six eggs were laid two young were reared (H.W.B.).

2. Hooded Crow.—As usual, most records of this species occurred near to the coast—14 near Loftus-in-Cleveland on January 24th (R.S.), and *c.* 40 near Scarborough in late March (A.J.W.). At Spurn, May 1st, was the date when the last bird was seen in spring (R.C., E.C.), and October 10th the date of the first appearance in autumn (G.R.E., W.F.); after which small parties occurred frequently, with twenty as the approximate maximum seen in a day on October 31st and November 3rd. Single birds occurred near Crathorne on March 10th (J.P.U.), and on Ilton Moor on November 20th (P.Y.).

3. Carrion Crow.—On March 15th about 50 birds occupied a roost in Handale Wood, Loftus, which has been used for several years (R.S.). On November 13th J. P. Utley listened to sounds from a Carrion Crow that appear not to have been described before—' like two stones being sharply and rapidly tapped together for about a dozen times, repeated at intervals for five minutes, and then again from another tree.'

4. Rook.—Large flocks at Kilnsea on May 9th may have been breeders dispersed early, but more likely were migrants about to cross the North Sea. In the Washburn Valley on May 22nd, about 60 Rooks and 90 Jackdaws appeared to be a typical mixed winter flock—it was still not too late for possible continentals (M.F.M.M.). We had no doubt about a large compact formation of about 500 Rooks that flew very fast in from sea at Spurn on October 28th, cawing loudly as they crossed the coast and passed up the Humber in late afternoon, followed by a long straggling procession of Jackdaws which appeared to keep the great pace of the Rooks with difficulty (R.B., R.C.). In a flock of some 3,000 birds at Sherburn on December 17th the majority were Rooks, and most of the remainder Lapwings (P.A.H.).

5. Jackdaw.—A pair nested at Collingham in a 30-feet spruce, making a rook-like nest, with many sticks dropped below. They hatched three eggs (R.H.). The brown Jackdaw of 1947 at Kingthorpe was in the same locality on March 28th, 1948 (R.M.G.). Miss Crackles watched a Jackdaw at Welwick on May 1st, pulling out clumps of hair from a cow's back. N. M. Hepworth reports a similar occurrence at Thirsk on April 29th seen by P. C. Thompson.

7. Magpie.—It was estimated that Magpies on Addingham Moors on February 7th numbered more than 100 (Miss M. Mackenzie). The starling roost at Nunthorpe continues also to be used by considerable numbers of Magpies (O.C.H.).

10/11. Jay.—On February 20th, in Dalby Forest, about 20 birds seen from above amongst hawthorn bushes appeared very grey on their backs, with the possibility that they were of the continental race (A.J.W., M.F.M.M.). R. M. C. Potter reported two flocks of 30 birds flying high and south over the Humber near Hessle on April 22nd. The flocks were about an hour apart and were followed by a few stragglers. A few Jays were at Wassand up to the end of April; and two at Winestead on May 6th (H.O.B.). A bird was ringed at Spurn on May 28th (E.H., S.J.).

14. STARLING.—A roost at Knapton on February 8th and 21st held at least 50,000 Starlings, and up to 100 Redwings, and 20 Magpies (R.H.). The Nunthorpe roost was estimated to hold 500,000 birds on February 8th (O.C.H.). Captain Stam noted Starlings crossing the North Sea towards Europe on March 3rd (O.C.H.). At Spurn, on October 29th, many thousands rushed down the estuaryside towards the Point (R.B., E.C., R.C.). On October 30th a number of large parties came off the sea (G.H.A.), and for some days there were packs along the promontory. Strings of Starlings flew in from the sea to Teesmouth on October 10th (A.B.). Several flocks flew in from sea to Cloughton Wyke on October 9th (A.J.W.). The following ringing records have been reported by Miss Leach (see *British Birds*).

Ringed by R. Carrick near York on 7/2/47, recovered Norfolk 19/1/48.
Ringed by R. Carrick near York on 14/2/47, recovered Sjaelland, Denmark, 9/9/47.
Ringed by R. Carrick near York on 7/3/47, recovered Borger, Holland, 3/5/47.
Ringed by R. Carrick near Leeds on 18/2/47, recovered Rhyl, Flintshire, 20/1/48.
Ringed by R. Carrick near Leeds on 18/2/47, recovered Drogheda (Co. Louth) 6/1/48.
Ringed by R. Carrick near Leeds on 18/2/47, recovered Co. Dublin, 26/1/48.
Ringed by R. Carrick near Leeds on 19/2/47, recovered Danzig, Poland, 30/10/47.
Ringed by D. Ramsden, Northallerton, on 25/2/47, recovered Tarvin, Cheshire, 26/11/47.
Ringed by R. Chislett, Masham, on 20/3/47, recovered Denton, Manchester, 2/12/47.
Ringed by A. W. Boyd, Cheshire, on 31/1/47, recovered Askern, Doncaster, -/4/47.

All these birds were trapped in the severe weather of early 1947. A Starling shot near Barlby, Selby, on 21/2/48, bore a Riga ring. An almost white example was seen several times in the Acomb and South Bank districts of York (F.J.).

18. HAWFINCH.—There were several nesting pairs around Oswaldkirk and Ampleforth (F.J.). Six young were reared in Duncombe Park (A.G.). A pair bred at Bolton Abbey (D.I.T.W.). On April 4th, in Dr. Crosbie's garden at Ben Rhydding, there were two cocks and a hen, with a pair on May 3rd. A head with feathers was found near Otley on April 23rd (W.F.F.). Two birds occurred near Richmond on April 18th (J.M.McM.). A cock sang near Strines on May 25th (K.W.). Three were seen between July 4th and 18th almost daily within two miles of City Square, Leeds, probably attracted by cherries (M.F.M.M.), and four in a cherry-tree at Swanland in September (F.C.N.).

19. GREENFINCH.—A bird ringed in Hertfordshire on February 25th, 1948, was near Loftus (N. Yorks.) on March 6th (E.P.L. in *British Birds*). A pair had six fledged young at Richmond on April 16th (J.M.McM.). A bird sang near Apperley Bridge on November 11th and 16th (R.F.D.). O. C. Hill records berries of Cotoneaster Simonsii as food on December 14th.

20. GOLDFINCH.—The species was generally scarce even in its usual haunts, but is seen frequently near Nunthorpe (O.C.H.). Flocks occurred on February 29th, when *c.* 40 fed in straw among sheep at Hooton Roberts (C.G., R.B.); in larches in Skipton Quarry on February 8th (A.T.); at Sigglesthorne on January 10th, eight birds (E.C.); and odd birds at Apperley Bridge on November 6th (R.F.D.); and near Loftus on December 5th when a bird sang (R.S.). At Hardcastle Crags a pair was present on April 12th (B.A.); and near Ben Rhydding five on November 7th (R.S.P.B.), with a pair on April 24th (K.C.C.). At Spurn six were recorded on January 9th (G.R.E.), and one on May 18th (G.H.A., R.F.D.).

21. SISKIN.—Flocks have been not infrequent, usually about alders, as near York—the largest visitation for many years (F.J.); near Bretton, 50-60 on November 13th (J.C.S.E.); near Hebden Bridge, 30-40 on December 21st (W.G.); near Sheffield, *c.* 50 on December 28th (C.H.W.); near Scarborough, *c.* 40 on December 12th (D. Wheatley); in Thornton Dale on February 10th and November 10th and other dates (R.M.G.); near Thirsk, 20 on December 23rd (B.F.); at Hardcastle Crags, 35 on December 27th (H.Z.G.); and 20 near Ilkley on December 30th (K.C.C.). In the early part of the year flocks were fewer and smaller, but E. Appleton recorded 20 in Kildale Wood on February 9th.

23. MEALY REDPOLL.—The species was noted at Haxby on November 5th, with small numbers about during November and December (F.J.); and at Ben

Rhydding, seven on November 21st (K.C.C.). At least one very grey bird with white wing-bar consorted with Lesser Redpolls in Thornton Dale on December 30th (R.M.G.).

25. Lesser Redpoll.—The species was seen near York in good numbers, especially when birch seeds were ripe in October (F.J.), and near Ilkley on December 22nd and 30th (K.C.C., D.I.T.W.). Breeding pairs were sparse, but I located several (R.C.). Small numbers were seen near Hessle (four on April 30th), and North Ferriby (six on June 12th), a party of six in Pickering Park, Hull, on April 13th (E.C.), and about 30 near Moortown on March 21st (J.H.E.).

29. British Twite.—Four occurred at Pool-in-Wharfedale on January 18th, when the yellowish beaks were noticed and the characteristic notes heard (M.F.M.M.). At High Royd five occurred on January 24th (H.Z.G.). Between Halifax and Burnley breeding was normal (H.Z.G., B.A.) ; and a pair was noted on Great Shunner Fell on May 20th (J.P.U.) ; and a brood on Ilton Moor on July 17th (P.Y.). Five occurred on rough pasture in Bransdale on December 10th (A.G.).

32/33. Bullfinch.—A cock at Ilkley on May 11th fed on seeds of yellow poppy (W.F.F.). Four birds in Boynton Woods on March 1st were all cocks (H.F.W.). A large and very bright male at Loftus on January 17th was believed to be of the northern race (R.S.). At Spurn a Bullfinch occurred on October 28th, and two on October 31st (R.C., R.B., G.H.A.).

40/41. Chaffinch.—Captain Stam reported Chaffinches crossing the North Sea towards the continent on March 3rd. At Spurn the largest numbers were recorded between October 6th and 10th, when more than 40 birds were ringed (G.R.E., W.F.F.) ; and on November 1st, when numbers were estimated at 200 birds. A bird ringed at Spurn on May 6th, 1947, was recovered at Balerno, Midlothian, on March 29th, 1948 (E.P.L. in *British Birds*).

42. Brambling.—Late dates in spring were : April 11th, 40 at Leathley (R.H.), and a large flock near Wigginton (F.J.), whereabouts the species was last seen on April 18th (J.L.) ; on April 23rd in Dalby Forest, where they fed on birch buds (R.M.G.) ; and an odd bird at Spurn on May 2nd, where the first bird of autumn occurred on October 1st (R.C.). At Rowley flocks of about 100 occurred up to the year end (D.C.U.), with similar numbers about the beeches in Thornton Dale (R.M.G.) ; and smaller numbers were reported from a number of areas.

43. Corn Bunting.—About 20 were included in a mixed flock at Spurn on January 8th (G.R.E.). Thinly distributed in the Haxby area (F.J.), the bird was plentiful near Escrick on May 16th (J.L.). A.J.W. reports a colony, believed resident, near the coast at Burniston. Individuals of this species not infrequently sing in winter, and D.C.U. heard birds on November 22nd and December 15th and 18th.

[58. Lapland Bunting.—A small Chaffinch-sized bird with undulating flight, on moors near Halifax on February 22nd was thought to be of this species. With a call-note sounding like ' tshee-tshee ' it hovered eight yards away over grass seed-stems protruding through snow, then disappeared over a wall. The bill was yellow, outer tail feathers showed white, the crown dark, with greyish mantle and dark primaries, and a greyish patch on the back of the neck (S. Cockcroft).]

59. Snow Bunting.—A flock was present at Spurn in early January, with 75 present on the 2nd (G.R.E., G.H.A.), and an odd bird was seen there on April 12th and 15th (R.F.D.). At Teesmouth the species was last recorded on March 7th—about 30 birds (A.B.). Inland, two birds occurred at Gorple on February 15th (H.Z.G.). In autumn a single bird was seen near Spurn on October 7th (G.R.E., W.F.F.), with about 24 on November 7th (H.O.B., A.McA.). At Teesmouth, first reported on November 3rd (O.C.H.), with about 20 there on November 6th ; numbers increased subsequently until flocks estimated at 400 birds, of which the majority were males, were seen performing wader-like evolutions on December 12th (A.B.). About 40 were present on Bransdale Moor on December 10th (A.G.). On November 3rd 12 flew south along the coast near Scarborough. A bird lived below Castle Cliff, Scarborough, from December 5th to 16th (R.M.G.).

62. Tree Sparrow.—Seven birds were seen near Leathley on March 19th, and on July 4th near Leathley Hall, adults and young were noted (R.F.D., P.E.D.). On April 3rd at least three were included in a mixed flock at Esholt S. Works (R.F.D.). J. Lord reports the species as plentiful around Gate Helmsley, and

young birds in the nest at Naburn on May 27th. On October 11th about 50 birds flew south at Spurn (G.R.E., W.F.F., etc.).

69. Woodlark.—In the area in which the species recently nested the song was heard on several days in March, and the bird was seen at close quarters on the ground (J.L.). A bird was noted at Spurn on September 5th and 6th at very close range (G.H.A., A.B.W., J.L., N.F.E.), and another was reported on September 16th (D.A.T.M., K.T.M.).

70. Skylark.—There were about 200 on snow-covered stubble at Eccup on February 21st, and more than 50 on a refuse tip at Beeston, near Leeds, on February 22nd (K. Brown). Parties of Skylarks passed steadily southwards across the Humber at Stonecreek all day on October 9th (R. Hewson). Birds were passing south all day on October 11th at Spurn (G.R.E.). A strong southward movement was noticed at Scarborough on October 29th (R.M.G.), on which day, and the two following days, considerable numbers passed at Spurn (R.C.) and at Filey (H.J.R.P.).

72. Shorelark.—Authenticated records of the Shorelark of recent years in Yorkshire have been extremely few. I know of only three records in the past ten years. Consequently the appearance of some numbers at Kilnsea and Spurn in 1948 gave pleasure and interest to many. A. H. White and E. Crackles saw the first on April 3rd, three birds on gravel and sand between the chalk bank and the railway ; and a bird was seen nearby on the 7th by R. F. Dickens and T. B. Dean. On October 29th, some larklike birds picking about on the shingle of the estuary beach near to the cottage were revealed by binoculars as Shorelarks, and when they flew we counted eighteen (R.B., R.C.). As they flew a very shrill but not unmelodious chorus came from them. Later three more were seen, and Shorelarks remained about until the year-end ; 22 were seen feeding on Humberside wrack near to the Cottage on November 14th (G.H.A., A.H.W.) ; 29 seen in one flock on the same day (S. Eastwood) was the largest number recorded.

75. Tree-Pipit.—The earliest record came in the Vale of Mowbray on the very unusual date of March 23rd (J.P.U.). Other more normal early dates were April 10th at Scotton (K.I.), and April 11th near Rotherham (F.N.), on which date it was also noted at Spurn (T.B.D., R.F.D., E.W.T.). Most observers saw the bird first about the 18th. Two birds were noted at Spurn on September 11th—the latest (R.F.D., F.C.G., G.H.A.).

76. Meadow-Pipit.—There were a few in the Northallerton area all winter (J.P.U.), and an odd bird on January 2nd, and two on the 14th, occurred on Ilton Moor (P.Y.). Near Strines large numbers arrived on March 14th and spread ; nests held small clutches, many of three eggs, and fertility was poor (K.W.). There was a small flock at Wintersett on March 30th (J.H.).

81. Rock-Pipit.—Odd birds were noted in the last week of March at Spurn (H.O.B., H.G.B.) ; and a few in early October, with a maximum of 12 on the 9th (W.F.F., etc.). Two birds were at Brough on October 17th (H.O.B.). At Teesmouth, where the species is a winter resident in small numbers, birds were noted on several occasions from November 27th (A.B.).

88. Yellow Wagtail.—A bird at Goldsborough Dam on April 4th was the first recorded in spring (W. Beck, per A.G.W.) ; with two cocks at Ilkley Filter Beds on the 11th, still early. Most observers made their first records from April 15th to 20th. At High Royd three birds seen on April 26th bore rings placed on them in 1947 (H.Z.G.). Young were reared in two nests within two miles of the centre of Leeds in 1947, and were again present in 1948 (K.B.). One pair reared young in the Vale of Pickering (R.M.G.). In more usual breeding areas birds were in good numbers. Birds were first noted at Spurn in autumn on August 16th with a maximum of 13 on August 17th (R.M.G., G.H.A., M.H.). Rather more passed at Spurn than usual, the last record was dated September 19th (D.A.T.M., M.R.K-P., H.O.B.), with September 18th as the last date in the Halifax area (H.Z.G.). At Esholt S. Works there were two Yellows with some 40 Pied on September 20th (R.F.D.).

89. Grey Wagtail.—A pair were close to a breeding haunt near Masham on March 17th (R.C.). The species is still comparatively scarce in the Dales.

90. Pied Wagtail.—There were more than 50 birds at Wintersett on February 1st (J.H.), and *c.* 45 at Esholt S. Works on September 20th (R.F.D.).

91. White Wagtail.—Single birds were noted on April 5th at Dowley Gap (B.N.S.), and at Swillington Ing on May 5th (F.R.A.) ; at High Royd on April

14th, and four on April 29th, with one on the 30th (H.Z.G.). Two birds occurred near Spurn on April 14th (R.F.D., F.R.A.).

93. Tree Creeper.—A pair in Spring Woods, Esholt, preferred a crevice in a stone wall to hold their nest despite availability of more usual sites. On June 7th near Wakefield, young were fed every three-four minutes ; on June 12th every two minutes (J.H.).

96. Nuthatch.—A bird was seen at Roundhay, Leeds, on March 20th (P.B.). The male of R.M.G's tame pair in Thornton Dale disappeared in April when his mate was brooding ; the hen attempted to carry on but finally deserted and remained a widow up to the year end. Nesting reports came from the Maltby area (R.B., C.G.), Catterick and Richmond areas (J.M.McM.), Helmsley, where all usual holes were occupied (A.G.), Eccup (M. and S.B-S.), Masham. Two birds that I had ringed in the previous winter were visiting my garden again in December (R.C.).

98. Great-Tit.—Up to eight birds were about Warren Cottage in early January. A bird caught at High Royd on August 24th, 1948, and January 3rd, 1949, had been ringed there on August 13th, 1947 (H.Z.G.).

99/100. Blue-Tit.—At Boston Spa a pair nested in the top of a street gas-lamp standard (J.D.H.). A clutch of eight eggs in May, which duly hatched, was followed by a second laying of six, which flew in July (K.W.). At Spurn about 30 birds were noted on October 1st of which 16 were ringed and were considered to be of the continental race, with pale-green and greyish-green backs, pale yellow under-parts, and with larger tips to greater coverts than average British Blue-Tits (R.C.). A few continued to be seen for most of October.

108. Willow-Tit.—Birds were reported from Knapton on January 4th, and Healaugh (two different areas) on February 15th (J.L.) ; from Methley, a pair on May 23rd (M.F.M.M.) ; from the Vale of Pickering, where adults fed young in a blackthorn stump on May 27th (R.M.G.) ; and near Pickering, two on October 23rd (M.F.M.M.). Single birds were noted at Spurn on October 7th (ringed), and 8th (G.R.E., W.F.F., etc.).

111. Long-tailed Tit.—A pair began building in a yew in Thornton Hall garden by February 12th ; the nest was completed, but later the birds disappeared (R.M.G.).

[112. Bearded Tit.—Two cocks and a hen were reported in reeds near the River Leven at Ingleby Barwick on December 6th and 7th by D. Moore, who lives near, and had seen the species before (O.C.H.).]

114. Great Grey Shrike.—Single birds were seen at Spurn on October 8th (G.R.E., W.F.F., etc.) ; October 29th (ringed) (R.C., R.B.), and November 2nd (R.C., T.B.D., R.F.D.). On October 31st two were seen (G.H.A. and E.C.). A bird was picked up dead on a road near Escrick in a fresh condition on November 3rd and sent to *The Game Keeper* (P.Y.). A bird was present at Skipwith during the winter months (B.D.).

119. Red-backed Shrike.—A bird was seen at Langwith on May 24th (B.D.). P. W. P. Browne saw an immature bird or a female near Easington on September 9th.

120. Waxwing.—There have been a few occurrences—one in Thornton-le-Dale on February 15th, one in Peasholm Glen, Scarborough, feeding on hips on February 22nd (A.J.W.) ; one reported at Catterick on February 28th ; one in Snuff Mill Lane, Hull, on January 30th (E.C.) ; one seen by Mr. Conway near Haltemprice, also in January ; and a party of seven in Middlesbrough Park on December 11th, and 12 on the 27th, where the species was still present at the year end (O.C.H.).

121. Spotted Flycatcher.—April 25th, at Coniston Cold (R.T.), May 7th, at Ilkley (D.I.T.W.), and May 11th, at Apperley Bridge (R.F.D.) were early dates. The species was first noted at Spurn on May 13th. At Blackmoorfoot Reservoir, altitude 900 feet, a few were probably already on passage on August 2nd (J.C.S.E.). The bird was last noted at Spurn on October 6th (G.R.E., A.M., E.R.).

122. Pied Flycatcher.—The areas in which breeding is known to occur yearly, in and about the dales to the east and west of the central plain, were well occupied. During the Whitsuntide meeting of the Y.N.U. at Thirsk, birds were noted with holes at two places near to the western escarpment of the Hambleton Hills. A pair reared young in Wentworth Park, near Rotherham (F.N.), well away from the hills usually associated with the species. Birds were also reported in the breeding season from Chevet Wood, Wakefield (J.H.), Strines (K.W.),

near Thorner (K.B.), Lindley (J. A. Forder), Birk Crag (K.I.), Loftus-in-Cleveland (R.S.), Buttercrambe (B.D.), and Dent (H.W.B.).

At Spurn, April 18th was an early date for the only spring record (M.H.). In the autumn, after odd birds on August 2nd (D.C.U.), and 13th, birds appeared again on August 28th, and almost daily until September 13th, with a maximum of 15 on September 5th (G.H.A., J.L., A.B.W.), and no more until two appeared on October 9th and one on the 10th (G.R.E., W.F.F.).

Two of the young birds colour-ringed in Dalby Forest in 1947 were seen in 1948 ; both were males—a black and white bird and a brown and white bird. The latter bird mated with a normal hen and reared eight young. Colour-ringing has thus confirmed that Pied Flycatchers can breed in the year following birth ; and that the normal black and variant brown in the cockbird's plumage are both possible at the same age (R.M.G.).

125. Red-breasted Flycatcher.—One bird was recorded at Spurn on October 8th and 9th (G.R.E., W.F.F., etc.).

126/7. Goldcrest.—After being almost absent from Yorkshire in 1947 following the great frost, the species is now on the way towards recovery, although still described as scarce in 1948 by R.M.G. in the north-east. A few birds were noted in the early months—Washburn Valley, two on January 25th (M.F.M.M.), two at Swinsty on February 15th (P.E.D., R.F.D.), two near Masham on March 9th, four near Scotton on March 25th (A.G.W.). Near Strines (K.W.), Eccup (F.R.A.), Bretton (J.C.S.E.), and Masham birds were in evidence in spring and summer and bred successfully.

At Spurn, Goldcrests were first noted on October 7th, with about 100 on the 9th, and a few continued to be seen daily until the 16th (G.R.E., W.F.F., etc.). More birds appeared on October 28th and 29th ; and on the morning of the 30th they flitted in every bush all down the promontory to an unknown number of well over 1,000 birds. Kilnsea farmers declared they had never seen so many ' woodcock pilots.' During these few days about 60 entered the ringing-trap. How many there were at other parts of the Yorkshire coast is problematical, but R. Slater reported immigrants on Boulby Cliffs on October 30th and H. J. R. Pease saw a few near Filey from the 28th to 30th. By November 7th only a few were left about Spurn. A boat off Spurn piloted by R. Raddings on October 29th ' was covered with Goldcrests ' when he took over. They had come aboard off somewhere between Whitby and Flamborough Head. As the ship entered the Humber birds left it, flying in small parties towards the Lincolnshire coast, although Spurn was much nearer. Had the irruption a connection with the ' considerable numbers in pine plantations at Eccup since autumn ' (M. and S.B-S.), and with ' parties everywhere at Hardcastle Crags on November 21st ' (H.Z.G.)? On December 25th there were a few at Danes Dyke (F.W.).

129/130/131. Chiffchaff.—March 21st at Waddow Hall (J. J. Boon), March 24th at Scotton (K.I.), March 25th, near Strines, where a bird sang for two days before passing on, March 26th at Thornton Dale (R.M.G.), and Buttercrambe (J.L.) were the earliest reported dates. The species was not ringed at Spurn this year. Single birds, ' thought to be Chiffchaffs,' on April 28th and November 2nd are the only occurrences mentioned in the Observatory books.

132/133. Willow-Warbler.—A bird near Ripon on March 14th was seen clearly at four feet range (H.G.B.). April 3rd, Bretton (J.C.S.E.) and April 4th, Methley (P.B.) were also abnormally early dates. By the 10th and 11th birds were heard in many places.

A female ringed at Bronte House, Apperley Bridge on July 23rd, 1947, was re-caught on May 8th and on June 11th, 1948, on which latter date it was feeding six young 150 yards from last year's nest. Only this bird was seen to feed the young until five were fledged. On the next day the sixth was out and being fed by an unringed bird, presumably the male (R.F.D.).

At Spurn the species was first noted on April 14th (R.F.D., F.R.A.). On April 18th they were everywhere, with very few left on the 19th (R.F.D.). A bird ringed on May 11th (H.G.B., R.C.) and two on May 15th (R.F.D., T.B.) were thought to be of the Northern race. Two birds were noted on October 31st, and one on November 1st (R.F.D., R.C.). The capture at Spurn of a Willow-Warbler on August 8th, that had been ringed on the Isle of May at the end of July, was evidence of coastal migration, but could not be said to establish a 'route.'

135. Wood Warbler.—April 18th, at Middleton, near Leeds (K.B.), and April 20th, near Masham (R.C.) were the earliest dates. At Spurn single birds were noted on May 11th (H.G.B.), September 2nd (E.C.) and September 10th (R.F.D.). G.H.A. noted four birds in the Spurn cottage garden in July.

137. Yellow-browed Warbler.—A bird was caught and ringed at Spurn on October 7th (G.R.E., W.F.F., etc.)—the first of the species to be recorded for many years.

145. Grasshopper Warbler.—Records are all of birds heard reeling—at Roche Abbey on April 18th, two on April 24th, and one on August 8th (R.B., F.C.G.) ; one at Eccup on April 24th (K.B.) ; one at Collingham from April 23rd to May 21st when R. Hewson left the area ; four west of Doncaster on May 1st (R.B., F.C.G.) ; near Rotherham on May 6th and 7th (F.N.) ; near Wakefield on May 8th and 10th (J.H.) ; near Harewood and near Wetherby on May 15th (M. and S.B-S.) ; in the Vale of Mowbray on May 9th (J.P.U.) ; at Cayton Bay on May 9th (J.L.) ; at Selby on June 12th (P.A.H.) ; on Malham Moss, June 12th to July 24th (P.F.H.) ; and near Semerwater during the first week of August (A.B.). Surely in 1949 breeding can be proved in more than one of those areas.

149. Reed-Warbler.—A pair were building at Scarborough Mere on May 8th (A.J.W.). A bird sang at Castle Howard on June 24th where the species was colonised up to a few years ago (R.M.G.). Skipwith birds had arrived on May 16th (J.L.). Nests yearly in the lower Rye and Derwent areas (W.H.W.I.).

153. Sedge Warbler.—April 24th, at Spurn, and April 26th, at Methley (P.B.), at both of which the species breeds, were the earliest dates. At Swillington Ing a bird was last noted on October 2nd (F.R.A.), and at Spurn on September 14th (R.F.D., E.H.).

159. Barred Warbler.—Single birds were noted at Spurn on August 14th (ringed) and 15th (R.M.G., G.H.A., M.H.).

161. Garden Warbler.—A bird arrived at Methley on April 7th and sang daily until others came (P.B.) ; the next earliest date was the 17th, at Bretton (J.C.S.E.). At Spurn was first noted on May 6th (R.C., J.R.), and last recorded on October 3rd (G.R.E., R.C.), and on October 30th (G.H.A., E.C., R.C.). As in 1947 this species was recorded at Spurn more frequently than the Blackcap.

162. Blackcap.—A bird sang some five yards distant from A. G. Walker near Harrogate on April 11th. April 17th at Bretton (J.C.S.E.), April 18th at Roche Abbey (R.B., F.C.G.) and in Buttercrambe Woods (J.L.) were other early dates. Was noted at Spurn on May 4th (R.C., J.R.), and was last seen there on September 14th (R.F.D., M.R.K.P.).

163. Whitethroat.—A bird sang and was seen in the Vale of Mowbray on March 18th, 20th and 22nd (D.U., J.P.U.) ; no other was recorded before April 15th at Rowley (D.C.U.), April 18th at Roche Abbey (R.B., F.C.G.), and at Spurn (R.F.D., F.R.A., M.H.). Whitethroats were last noted at Spurn on September 21st (D.A.T.M., K.T.M.), and on November 3rd (R.C., R.F.D.). Four birds ringed at Spurn in the spring of 1947 were caught again in the spring of 1948. Three birds caught in August 1947 were caught again in the spring of 1948. Whether these birds were passage migrants, or breeding somewhere locally, is uncertain. Local breeders are fairly numerous, but a ringed local breeder was not located.

164. Lesser Whitethroat.—A bird was at Otley on April 4th (G.K.Y.). April 24th, near Dringhouses (J.L.) and near Loftus-in-Cleveland (R.S.) were the next early dates. R.M.G. has not heard the species in the Thornton Dale district since 1945, prior to which it occurred yearly, though not numerous. It is scarce in the East Riding this year (G.H.A.), and in the northern half of the county generally. May 4th (R.C.) and September 16th (D.A.T.M., M.R.K.P.) were the first and latest dates for the species at Spurn.

165. Siberian Lesser Whitethroat.—The late date caused detailed examination of a bird being ringed at Spurn on October 29th. The second primary was found to be between the 6th and 7th in length. Otherwise the bird resembled a typical example of *Sylvia c. corruca* (R.C., R.B.). All the British examples of the Siberian race that are quoted in the Handbook are of Scottish origin.

173. Fieldfare.—There were no very late dates for Fieldfares in spring—April 20th at Cottingham (E.C.) and April 25th at Spurn (G.H.A., A.B.W.) were the latest. The earliest autumnal records were at Riffa (Wharfedale) on September 5th and 6th (H.M., Miss E.M.B.), and five at Mount Stead on October 4th

(R.S.P.B.). East of the central vale birds were first noted near Northallerton on October 12th (J.P.U.), and at Spurn not until October 25th (R.C., R.B.), and up to early November few were seen there. The first Thornton Dale record was on October 27th (R.M.G.). Much the largest congregations occurred in the west, close to the county boundary above Burnley, where on October 31st B. Astin saw Fieldfares and Redwings in larger numbers than he had seen them before, and estimated them at some 5,000 birds of both species. They covered the ground, and parties numbering hundreds flew from one field to another. This was the time of the invasion of Spurn by Goldcrests and Robins. The same easterly winds no doubt affected both phenomena. The route followed by the Fieldfares to the western side of the Pennines cannot be conjectured. In 1948, Fieldfares have been more generally reported from the western side of the county, and in larger numbers, than from the eastern side.

174. Mistle-Thrush.—Numbers of nesting birds are still below normal, although partial recovery has taken place (B.D., R.C. and others). In Holderness the species is back to normal numbers (G.H.A.). Considerable numbers frequented the pastures near Strines in January and February (K.W.). A nest near Sheffield had been completed by February 29th (N. Wright, L. Carr).

175/177. Song Thrush.—In the York area numbers are almost back to normal (B.D.). Older observers consider that normality of (say) 1946 was considerably lower than that of (say) 1936. P. Baldwin says quite a lot have wintered near Methley, in the absence of long periods of frost. Around Masham Song Thrushes have been very scarce this winter. At Harrogate K. Ilderton says they disappear from his (northern) end of the town in late autumn, but A. G. Walker could hear up to four singing in late November at his side—factors that well illustrate difficulties of assessment of status. A bird ringed at Seaham, Durham, on May 28th, 1947, by R. Murray, was recovered at Guisborough on November 11th, 1947.

178. Redwing.—Birds in a large flock at Methley were singing on March 20th (P.B.). At Spurn a Redwing was last noted on April 18th (R.F.D., F.R.A., M.H.). In autumn two were seen at Spurn on October 5th (G.R.E., A.M., E.R.) ; and the species was numerous from the 8th to the 11th, from which time it began to be seen inland. The great assembly of birds in the Western Pennines on October 31st described by B. Astin under the heading of Fieldfare also included large numbers of Redwings.

182. Ring-Ousel.—First noted in spring on March 24th in the Halifax area (H.Z.G.). A cock bird at Gorple on April 25th bore a ring—young have been ringed there in past years (J. Crossley per H.Z.G.). The only bird recorded at Spurn occurred on September 10th (E.H., R.F.D., R.B., F.C.G.).

184. Blackbird.—A nearly white cock near Wakefield had been gaining white and losing black for four years (D. F. Beckett) ; and other albinistic birds have been recorded. A Blackbird ringed at Masham on February 6th, 1947, was re-caught on February 19th, 1948 (R.C.) ; and a nestling ringed at Apperley Bridge on July 26th, 1947, was re-caught on February 20th, 1948 (R.F.D.).

At Spurn a bird ringed on April 12th, 1947, was re-captured in May, August and October of 1947 and in April, May and July of 1948. Another bird ringed on November 15th, 1947, was at Kvaas, South Norway, on July 18th, 1948. H.J.R.P. saw upwards of 30 birds together near Filey from October 29th to 31st. There was an influx of Blackbirds into Holderness during the second week of November. At Spurn the species was less numerous than usual, with about twenty on October 9th (G.R.E., W.F.F., etc.), and similar numbers from October 27th to 31st (R.C., R.B.). Fewer birds were ringed than in 1947. A bird picked up dead in 1948 at Heslington was found to have been ringed there on May 11th, 1933 (B.D.).

186/187. Wheatear.—A bird occurred near Harrogate on March 8th, at the beginning of several days of warm weather (G.K.Y.). March 25th, near Thornton Dale (R.M.G.), and in Nidderdale (M. and S.B.S.) were the next early records. A bird ringed in Yorkshire on June 28th by J. J. Boon was in the Gironde district of France on August 30th. A bird at Catterick on October 24th was late (J.M.McM.). Spring passage at Spurn began on March 29th (H.O.B., H.G.B.) ; and the last autumnal bird was seen on October 14th, after being most numerous from September 5th to 10th. About twelve were at Swillington Ing on August 28th (K.D., F.R.A.), and young birds were still along walls by Roundhill Reservoir on September 12th (R.C.). Greenland Wheatears were seen at Spurn in both spring and autumn ; and one occurred on a roof at Hornsea on September 20th

(G.H.A.). Birds believed to be of this race were seen at Stape on April 27th, and at Scalby Mill on October 13th (R.M.G.).

197. Whinchat.—A bird near Whitby on April 22nd was the first reported (C.E.A.B.). Birds were noted in small numbers at Spurn from May 7th (R.C., H.G.B.) to the 18th (G.H.A., R.F.D.) ; and from August 17th (R.M.G., G.H.A.) at intervals to September 29th (E.C., R.B.). Two or three at Bretton on August 28th appeared to be on passage (J.C.S.E.). A movement of young birds was noted at High Royd in September, and seven juveniles on September 14th at Swillington (H.Z.G.), and one bird there on October 3rd (J.L.).

198. Stonechat.—No records received.

201. Redstart.—The first cock appeared in the Strines area on April 11th, where of ten pairs all nested in walls (K.W.). April 14th near Halifax (H.Z.G.) and April 17th at Bretton (J.C.S.E.), and Spurn (R.F.D.) were the next earliest dates. Birds at Spurn occurred at intervals up to May 26th (E.H., S.J.). And in autumn from August 13th (R.M.G., G.H.A.) to September 15th, with odd birds on October 7th and 9th (G.R.E.). A pair in Boothferry Road (Hull) gardens in June and July was very unusual (E.C.).

202. Black Redstart.—This species is seen with increasing frequency during the migration seasons on the coast. In spring birds occurred at Spurn on a number of days from March 27th to April 17th, with an odd bird on May 15th (R.F.D., A.K.W.). Autumn records were dated from October 6th to 11th (G.R.E.) ; and on the 28th and 31st (four birds) (G.H.A., R.F.D., E.C.). A very tame hen occurred at Teesmouth on November 6th (A.B.). Near Scarborough Castle two occurred on December 7th (D. Wheatley), and a female on the 8th (A.J.W.), and 10th (R.M.G.).

203. Nightingale.—Northward migration in spring brought several birds beyond the normal range of the species. A bird was caught and ringed at Spurn on May 9th (G.H.A., H.G.B.). In the night of May 12th a bird sang in Brantingham Dale, E. Riding (F. C. Niven). A Nightingale sang throughout May at Sigglesthorne (G.H.A.). A bird sang almost nightly from May 5th to June 5th in a coppice by the Wetherby-York road (M. and S.B-S.). A cock sang near Byland Abbey for a period in late May (W.H.W.I., B.F.) and was heard on June 4th by R.M.G. and W.B.A. ; and another was noted near Thirsk (B. Foggitt). One sang in the garden of Dr. Joyce Yeomans at Northallerton on May 24th and until June 20th ; a pair were present and believed to breed (J.P.U.). Birds were present in the normal Yorkshire breeding area near to the southern county boundary as they were in 1947 (G.E.H.).

207/208. Robin.—A pair of Robins reared a young Cuckoo at Haxby (F.J.). A juvenile was singing at Rudding Park on May 29th (K.I.). Robins were very numerous at Spurn from October 28th to November 2nd. There was some evidence of movement there from April 17th to 19th, and two caught on the 17th were considered to be of the continental race with yellowish breasts and greyish backs (R.F.D., F.R.A.). Many autumnal immigrants were of the same form. Ringing records include a bird found dead in a garden at Grimsby on November 4th, 1947, that had been ringed at Spurn on October 31st, 1947 ; and a bird caught at Pilning, Gloucestershire, on February 25th, 1948, that had been ringed at Spurn on October 26th, 1947. A Robin at Apperley Bridge ringed on July 6th, 1947, as juvenile, was re-trapped there in November and December, 1947, and in February, May and October, 1948 (R.F.D.). At High Royd birds caught on March 14th, September 30th and October 31st, of 1947, were re-caught respectively on January 18th, November 7th and November 14th, of 1948 (H.Z.G.).

210/211. Hedge-Sparrow.—A bird with pigeon-grey plumage was seen near Harrogate on July 31st (K.I.).

213. Wren.—Noted at Spurn on April 6th and 7th ; and from September 18th, at intervals to November 14th, with about twelve on October 30th (G.H.A., R.F.D., etc.). Fairly well re-established in most areas. A pair built inside a Dipper's nest of 1947 in the Loftus area (R.S.).

218. Dipper.—The same nest was used for two broods on the Roxby Beck, Loftus-in-Cleveland (R.S.).

220. Swallow.—First recorded on April 11th—Coniston Cold (R.T.), and Mytholmroyd (F.D.), with several records daily of birds first seen by other observers for a week thereafter. September 26th at Swillington (F.R.A.), and October 19th at Rowley, with young in nest on September 19th (D.C.U.) were

the latest dates inland. At Spurn the first were seen on April 14th (R.F.D.). August 18th and 29th, both moving southward ; and August 20th with many birds flying westward, were sample days of pronounced movement. On September 19th many birds were seen to continue heading due south after leaving the Point. Demolition of the hutments, with fewer breeders south of Kilnsea, will save some confusion in future. Last seen on October 18th (A.L.C.).

222. House-Martin.—A bird at Bolton Abbey was first noticed on April 6th (C.F.T.) ; with April 14th near Leeds (M. and S.B-S., and B. Bussey) as the next early date. Seventeen nests were counted on June 5th against the lower parts of Malham Cove (R.M.G.). Cliff nesting was also noticed on Huntcliff, Saltburn (O.C.H.) ; and between Staithes and Boulby where nests were more numerous than usual (R.S.).

April 18th was the earliest date at Spurn (R.F.D.). Autumnal movement was at its maximum from September 14th to 18th, with continuous passage on the 17th (D.A.T.M., M.R.K.P.). The species was last noted at Spurn on October 24th (R.B., A.L.C.). A bird in the Harrogate area on December 14th might have been of this or the next species (A.G.W.). Four fed at Filey on November 15th (H.J.R.P.).

223. Sand-Martin.—At Harewood, two appeared on March 27th (J. Akroyd). At Spurn (where breeds) the species was not seen until May 9th (G.H.A., H.G.B.) ; and the main passage south took place from August 18th to 21st. It was last noted there on September 28th. On June 5th birds were using holes made in peat hags fringing Malham Tarn (R.M.G.).

224. Alpine Swift.—G. F. Williams and G. Twist for twenty minutes on July 25th watched about ten Alpine Swifts as they hawked above tipped ground at Teesmouth. They were obviously larger than Common Swifts and displayed the usual light underparts (J. B. Nicholson).

225. Swift.—A bird flew round with Martins at Coniston Cold on April 20th (R.T.) ; and on April 28th one flew under a roof at Ben Rhydding and stayed (K.C.C.). R. Hewson saw two birds at Collingham on April 21st. R. Slater reported breeding in the slag tips of steel works at Carlin How. At Whitsuntide a few birds were entering and leaving crevices in the cliff above Gormire Lake (R.C., J.D.H.). First noted at Spurn on May 3rd (A.L.C., J.R.), and last recorded on October 4th (R.C., G.R.E.). In spring and autumn birds were seen there moving both north and south. A.G.W. reported many hundreds, perhaps thousands, flying S.E., S.W., and W. over Harrogate during the last ten days of August. Two flew over Stapleton Park on September 26th (J.C.), and one was at Wigginton on October 10th (J.L.).

227. Nightjar.—A female was flushed from below bushes at Spurn on April 19th (M.H.), and another was noted on September 1st (E.C., J.W.). A bird that had apparently been killed by a car some two weeks previously was seen on the road down to the Point on October 2nd (R.H.). On September 13th, a bird probably on passage, was disturbed from a garden on the outskirts of Sheffield (C.H.W.). Occurrences, some of them breeding records, have also been reported from Wharfedale, near Wakefield, near Thirsk, in Airedale, west of Sheffield, where several pairs nested, Cliff, Hotham where seen on April 24th and where nested (E.B.B.), and near Masham (P.Y., R.C.).

232. Hoopoe.—A bird occurred in a garden at Kirk Ella on April 17th (E.B.B.).

234. Kingfisher.—From the number of birds and pairs reported on various dates, it is evident that the species is on the way towards recovery from the effects of the disastrous frost of early 1947.

237. Great Spotted Woodpecker.—One flying south on October 13th (G.R.E., W.F.F., etc.), and one flying north on October 30th (G.H.A.), were unusual occurrences at Spurn. A bird ringed near Sheffield by R. H. Poulding on June 24th, 1947, was recovered at Tean (Staffs.) on December 25th, 1947. The pitch (tone) of a pair drumming on May 27th near Loftus, varied as they drummed on different branches, supporting the mechanical, not the vocal, theory of origin of the sound (R.S.).

238. Lesser Spotted Woodpecker.—Occurrences have been reported from near Rotherham (F.N.), near Ilkley (A. M. C. Duncan), Bretton (J.C.S.E.), Apperley Bridge (R.F.D.), Temple Newsam, where bred (D.L.), Buttercrambe

Woods (J.L.), Blackhills (B.N.S.), Rowley (D.C.U.), Swanland (F.C.N.), and near Masham (P.Y.).

240. Cuckoo.—The earliest record was at Methley on April 15th (P.B.) ; by the 22nd it was generally distributed. On May 9th the first egg had been found in a Tree Pipit's nest (K.W.). A young bird hatched by Hedge-Sparrows on July 4th in J. P. Utley's garden was fledged on August 5th and still there on August 22nd. At Spurn a Cuckoo was not observed until April 29th (A.L.C.) ; and was last recorded on September 4th (A.B.W., J.L.).

249. Little Owl.—Still not so numerous as before 1947, but perhaps numerous enough. In F. C. Niven's garden, Stock Doves took up residence in late June in a hole in which Little Owls had nested ; and the sitting dove was visible from outside owing to the shallowness of the hole. When a Little Owl flew to the edge of the hole on July 7th ' crack went the pigeon's wing and down came the Little Owl,' to hop on one leg under a viburnum bush, where the Stock Dove could not locate it. The other leg was fractured at the tarsal joint. Exactly the same thing had happened in 1947 in all respects except that then the two pigeons followed up the attack and killed the owl. Single birds were recorded at Spurn in autumn from September 18th.

250. Long-eared Owl.—The species remains scarce ; with odd occurrences reported from Temple Newsam, Ampleforth, Rowley ; and Allerthorpe Common where a nest with six eggs found on March 29th by D. Wade and L. Jones was robbed by boys later on the same day.

251. Short-eared Owl.—Many more of this species were seen than of the previous one. A keeper near Pateley Bridge said they could have shot eight during one grouse drive (P.B.). Bred near Gorple (H.Z.G.), and there is a report from D. Brown of breeding near Hull.

253. Tawny Owl.—At Bolton Abbey, a dead bird with claw wounds, and its own claws full of feathers was found below a nesting-hole on April 11th (C.F.T.).

254. White-breasted Barn Owl.—A bird ringed by Sedbergh School on August 1st, 1945, was recovered 15 miles south-west at Yealand (Lancs.) on October 3rd, 1947. Another ringed at Cawthorne, Barnsley, by R. Carrick on August 24th, 1947, was recovered 60 miles, south-south-west, at Alrewas, Staffs., on February 19th, 1948 (Miss E.P.L. in *British Birds*). A bird occurred at Spurn on January 8th (G.R.E.).

259. Peregrine Falcon.—Two young were reared at an eyrie in the north-west (H.W.B.). Odd birds have been seen near Wensley (Lord Bolton), near Methley (P.B.), near Halifax (V.S.C., I.M., F.D.), near Malham (P.F.H. and B.S.), at Spurn on several dates ; and two at Teesmouth on March 7th (A.B.). A bird ringed by Sedbergh School on July 15th, 1940, was recovered in Littondale in October, 1947 (Miss E.P.L. in *British Birds*).

261. Hobby.—A nest found in South-west Yorkshire on June 12th held three eggs. It was placed in a larch 37 feet above ground and appeared to be an old Jay's. Two young hatched on June 15th. Through binoculars from below the long wings, and the rufous-coloured thighs could be plainly seen as the female was fed by the male and the food transferred to the young. The young left the nest on July 9th and were often watched. Their greenish-yellowish breasts had arrow-like, downward pointing markings (M. Darlow). An adult male was found dead in a vermin-trap near Hornsea on July 24th, 1948 (C.F.P., G.H.A.).

262. Merlin.—Several pairs reared young. A bird was seen near the Bridestones, Thornton Dale, on February 2nd (M.F.M.M.) ; and one was seen by the keeper at Skipwith during the winter months (B.D.). Last seen at Spurn in spring on May 2nd (R.C.), and first recorded in autumn on October 3rd (G.R.E., A.M.). Two birds ringed as young on Hawksworth Moor on June 22nd, 1947, by R.F.D. have been found dead : one at Hinderwell (62 miles north-east) in January, 1948, where it had struck wire-netting in pursuit of prey ; the other at Kimberworth, near Rotherham, in December, 1948 (E.P.L.).

263. Kestrel.—A bird ringed by Sedbergh School on July 7th, 1946, was recovered 48 miles, north-north-west, at Rockcliffe-on-Eden (Cumberland) on February 18th, 1948 (E.P.L. in *British Birds*). There was distinct movement down the coast at Spurn at several times in the late summer ; as on August 20th when six were seen at once (R.M.G., G.H.A.).

268. Rough-legged Buzzard.—A bird near Countersett on May 14th, with white undertail and dark terminal band, and with a deeper mew than others they

had listened to, was thought by R.B. and F.C.G. to be a late bird of this species. A bird at Spurn on October 6th had a whitish underwing, and conspicuous black markings at base of the primaries, and a white tail with broad black terminal band (G.R.E., A.M., E.R.).

269. Common Buzzard.—Four young were reared in two nests (H.W.B.), and a third robbed of four eggs. Odd birds have been seen about the Pennines by several people, mostly in winter.

271. Marsh Harrier.—Birds occurred at Hornsea Mere on January 25th, and one throughout June and July (B.S., C.F.P., G.H.A.). A bird was seen travelling south at Spurn on August 15th (R.M.G., G.H.A., M.H.). On August 29th, a bird with creamy feathers on the scapulars and head, whilst quartering the reed-beds at Hornsea Mere, was joined by another, probably immature, bird (A.J.W., A.F.T.). A bird there on September 13th was dark brown, apart from a rather pale cap, and noticeably pale-buff shoulders (P.E.B., B.S.).

272. Montagu's Harrier.—Two or three birds were seen in the North Riding on various dates from May 21st to August 23rd, but proof of breeding was not forthcoming this year, although probably it occurred. A bird ringed on July 6th, 1947, by R.C., was recovered in Portugal in October, 1947. Only one bird was recorded at Spurn—on August 22nd (J.W., R.M.C.P.).

273. Hen Harrier.—Two female Harriers at Hornsea Mere on March 1st had white rumps and dark bars on wings and tails. Similar birds were seen on April 2nd and May 22nd (Miss B.S.). Two Hen Harriers occurred on Ilton Moor on November 30th (P.Y.).

277. Sparrow Hawk.—Mr. J. A. Forder watched a Sparrow Hawk pursue a Green Woodpecker across Lindley Reservoir on November 6th. Three times the Woodpecker was headed off as it reached shore before it was killed (W.F.F.). Odd birds passed at Spurn during autumn, with three on October 31st (G.H.A., R.F.D., etc.).

280. White-tailed Eagle.—An immature bird occurred in North-east Yorkshire for about a month from January 20th, and was watched by a number of competent ornithologists. (For details, see *Naturalist*, 1948, p. 114, R.M.G.)

284. Osprey.—An Osprey above Hornsea Mere on February 14th was seen with a fish in its claws (B.S.). At Swinsty Reservoir on May 19th a large brown Hawk with white underparts and white on head flew across the water to a fir-tree where it stayed for 15 minutes, and was examined through a telescope, before taking wing again and soaring (K.I.).

289. Heron.—A bird ringed in Norway Helleland, (Egersund) with an Oslo Museum Ring on June 3rd, 1947, was shot on the Lockwood Reservoir in September, 1947 (R.S.). Occupied nests in 1948 were—Hornsea Mere 13 (G.H.A.), Slenningford 3 (R.C.), Kiplin 3 (J.P.U.), Harewood 6 (W.B., W.F.F.), Gargrave 10 (A.T.), Shireoaks Wood, Healaugh 14 (W.B.), Scampston 8 (R.M.G.). There was no sign of recovery from the effects of the 1947 frost, but there were 15 birds at Gouthwaite Reservoir on December 22nd. A pellet below a roost at Swinsty contained wing cases of two beetles and fur from a vole (R.F.D.).

300. Whooper Swan.—Ten birds at Gouthwaite on February 14th were seen several times up to March 21st, but had gone on the 27th (R.C.). Three were at Swillington Ing from December 11th to 28th (K.D., F.R.A., D.L.); 13 at Gouthwaite on December 22nd (A.G.W.); 2 at Chelker Reservoir for a few days before and after December 27th (R.F.G.); and at Eccup on December 29th 40 flew away and 6 stayed behind—2 adults with 4 immature birds (M. and S.B-S.).

301. Bewick's Swan.—An adult and 4 immatures on January 20th were the only ones seen in the Vale of Pickering all winter (R.M.G.). Six occurred at Eccup on January 4th (K.B., F.R.A.), and on December 29th (J.H.E.). 17 left Rivelin Dam, Sheffield, on January 1st (C.H.W., A.F.T.). 49 at Farnley on January 11th flew south-west and were recognised by calls and short, stocky necks (M.F.M.M.).

303/307. Grey Goose.—19 came in from sea near Redcar on January 19th (P. Stead). 72 flew west over Horsforth on January 9th (P.E.D.). About 100 flew west over Temple Newsam on February 1st (K.B.). On February 15th about 150 flew west up Wharfedale (M.F.M.M.); and about 100 flew north over Ilkley (K.C.C.). On February 24th about 75 were seen over Ilkley (J. H. Boardman), and a large skein went northward near Ilton (P.Y.). The first autumn skeins passed over Thornton Dale on September 21st and 22nd; and a skein of about 100

on October 11th. On the night of November 1st/2nd a very large movement took place over the whole district from Scarborough to Pickering and Malton ; birds being lost in the fog circled over towns and villages all night (R.M.G.). There were 8 at Ilton Reservoir on October 22nd, and a flock flew over on October 26th coming from north-east (P.Y.) ; and 25 flying towards Gorple on September 18th veered towards the west coast (B.A.). 21 passed west over Swillington on November 14th (J.C.) ; and 29 on December 20th (B.S.). About 25 flew west over Ilkley on December 23rd (D.I.T.W.), and about 50 on the 24th (R.F.G.). 60-70 birds wintering at Teesmouth were seen on stubble on December 19th (R.S.), when a flock passed over Middlesbrough (O.C.H.).

303. Grey Lag Goose.—About 65 passed over Otley on January 6th, the call notes being definitely Grey Lag (G.K.Y.). On January 22nd there were five in a grass field by the Ure near Wensley (Lord Bolton).

304. White-fronted Goose.—Two immature birds were shot at Seamer Carr, near Stokesley on February 1st (O.C.H.).

307. Pink-footed Goose.—Three large flocks, almost certainly of this species, flew over Easington on August 5th—an early date (H.O.B.). About 200 were seen at Spurn on October 5th (G.R.E., A.M.). At Faxfleet on January 20th 300 flew in from north. On March 21st about 1,000 at Faxfleet gradually dispersed in flocks of about 100 as the tide rose, and they appeared to land on the Lincolnshire side (A.F.T.). Consorting with Canadas was one on Bretton Lake on February 14th (J.C.S.E.), and one on Ripley Lake on December 5th (A.G.W.).

312. Dark-breasted Brent Goose.—Up to 5 birds were at Spurn from January 2nd to 9th (G.R.E.), and 14 on March 2nd (H.O.B.). One consorted with Canadas on Ripley Lake on December 5th (A.G.W.).

314. Canada Goose.—Apart from the private parks where they have long bred, birds are usually present at Gouthwaite Reservoir and Ripley Lake in autumn and winter. At Ripley a pair had six young on July 11th (A.G.W.). Three were at Gorple Reservoir on March 24th (H.Z.G.) ; and three at Swillington Park on May 1st (H.Z.G.), with two on May 6th (M.F.M.M.).

315. Sheld-Duck.—A bird was seen at Eccup on March 14th (K.B., M. and S.B-S.) ; two at Chelker Reservoir on March 28th which flew westward (W.F.F.) ; and eight on April 16th (R.F.G.). In August there was a juvenile at Gouthwaite on August 18th (J.P.B.), and 21st (R.C.), and on the 28th (A.G.W.). A juvenile occurred at High Royd on the 23rd (H.Z.G.). One, sometimes two, juveniles at Swillington Ing from August 13th to September 5th (F.R.A., K.D., B.S.) ; one at White Holme Reservoir from September 5th to 11th (H.Z.G.) ; four adults at Eccup on September 27th (F.R.A.) ; one at Malham Tarn on September 22nd (P.F.H.) ; and at Coniston Cold one on September 21st, two on the 28th, three on November 3rd and six on November 17th (R.T.).

At Teesmouth, where Sheld-Ducks are usually present, there was a pair with a brood of nine just able to fly on August 15th (A.B.). Birds could usually be seen at Spurn, with 20 as the maximum on April 8th (A.H.W., R.F.D., T.B.D.). At least two pairs nested at Spurn, one bird with 11 eggs in a concrete ' look-out ' on the sands was killed by a dog that entered—no one had seen either bird to enter or leave the ' look-out ' (G.H.A.).

317. Mallard.—At Eccup the largest count gave 705 birds on March 7th of which one had a white neck ; an identical bird was at Swillington on March 26th. On May 18th, 227 birds were almost all drakes (K.B.). Other large numbers have been recorded : at Coniston Cold 425 on January 25th (R.T.) had become 19 on May 11th, but increased during the autumn to 375 on December 30th (R.T.)—' numbers keep about the same yearly.' At Swillington numbers dwindled from *c.* 1,000 on January 10th to 207 on March 24th and to *c.* 20 on April 24th (F.R.A.).

Roundhill Reservoir had about 300 on September 12th (R.C.). A white Mallard occurred on a tarn above Wensleydale on January 17th ; whereabouts Lord Bolton says : ' these post-war years have been notable for an increase in both numbers and species of duck.' Hornsea Mere showed about 350 on January 24th (G.H.A.) ; and Lockwood Reservoir about 300 on December 1st (R.S.).

318. Gadwall.—Birds have occurred at Fewston, a pair on April 24th, apparently feeding on flies, snapping bills like ducklings (M.F.M.M.), and on the 27th (R.F.D., P.E.B.) ; at Winterestt two on May 19th (J.C.) ; at Swillington Ing, one on August 2nd (F.R.A.) ; and at Coniston Cold 11 on most days after November 28th (R.T.).

319. Teal.—Fairly plentiful at most waters in winter in varying numbers. Coniston Cold, 65 on January 31st (R.T.) ; Gorple, 168 on November 10th (E.W.W.) ; usually numerous at Gouthwaite ; at Swillington Ing *c.* 150 in late January and early February (F.R.A.).

322. Garganey.—Occurred more frequently than usual. At Thornton Marishes three drakes and one duck were seen on March 14th and a drake on the 17th and 19th (R.M.G.). A drake and two ducks were at Winestead on April 10th (H.O.B.). and a drake on the 18th (E.C.). In the West Riding there was a pair at Ripley Park on April 3rd (A.G.W.) ; one bird at Swillington Ing on April 24th (F.R.A., D.L.), and on May 9th (K.B.) ; and a pair on May 10th ; with a drake at Mickletown Flash on May 20th (M.F.M.M.), and a drake at Bottom-boat, Wakefield, on May 19th (B.S.).

323. Wigeon.—A bird shot at Wressle, Selby, on February 14th, 1948, had been ringed in Iceland on July 29th, 1947. Seven birds were still at Swillington Ing on May 9th (K.B.) where numbers had dwindled from *c.* 700 on February 6th (F.R.A.). First noted at Spurn in autumn, 17 on August 28th, after which birds flocking in the estuary increased gradually to a maximum of *c.* 450 on October 11th. There were *c.* 200 off Bridlington on September 22nd (P.W.P.B.). The species was present at most large inland waters in autumn with *c.* 250 at Gouthwaite on December 22nd (A.G.W.) as a maximum ; at Teesmouth, winter flocks of up to 70 birds occurred regularly (A.B.).

325. Pintail.—A duck occurred at Hornsea Mere on March 1st (Miss B.S.) ; one at Spurn on September 13th (D.F.W., R.F.D.), and five on the 14th (M.R.K.P.). On inland waters the species continues to appear in small numbers in winter—Ripley Park, Cleveland Tontino, Bretton, Coniston Cold, Wintersett, Eccup, Skipwith—with Swillington Ing, 11 on February 18th (D.L., K.D., F.R.A.), as the most regular haunt, and showing the largest parties.

326. Shoveler.—From September 3rd birds were usually present on Ripley Park Lake, and by November 6th had increased to 15 drakes and 20 ducks (A.G.W.). At Eccup the species could usually be seen from August, with 19 birds there on October 31st (K.B.). Swillington Ing had the largest numbers with *c.* 30 on March 20th (F.R.A.), with 27 on April 17th, 20 drakes on June 7th, and over 100 of both sexes and ages on August 22nd (B.S.). A few birds were also reported from Skipwith, Farnley Lake, Gouthwaite, Malham Tarn, Coniston Cold (24 on November 12th (R.T.)), and Semerwater. Up to 19 were at Hornsea Mere between July 4th and September 26th (P.W.P.B.).

328. Common Pochard.—Small numbers have been reported from Fairburn, Eccup, Ripley Park, Gouthwaite, Redmires, Coniston Cold, Farnley, Lindley, Skipwith, and Wintersett ; for all of which *c.* 50 on April 4th at Fairburn (M. and S.B-S.) and *c.* 250 at Swillington on February 29th (F.R.A.) were exceptionally large numbers ; but not for Hornsea Mere where 45 were counted on March 6th with drakes preponderating (E.C.)—a duck and five ducklings were seen there on July 1st (P.W.P.B.).

330. Tufted Duck.—This species was usually present on most Yorkshire waters throughout the year in small numbers. Swillington Ing and Fairburn Flash attracted the largest numbers, about 50 being seen at each during the early part of the year.

331. Scaup.—A duck and a drake, sometimes both together, were seen at Swillington Ing on various dates from January to March (F.R.A., K.D., B.S., D.L.). A duck occurred at Spurn on October 9th (G.R.E., W.F.F., etc.). At Hornsea Mere single birds were seen on January 23rd and 31st (B.S., G.H.A.).

332. Goldeneye.—Gouthwaite, Eccup, Chelker, Fewston, Swinsty, Lindley, Wintersett, Farnley, Harewood, Bretton, Swillington, Ripley, Roundhill, Ilton, Ardsley, Fairburn, Ogden, Coniston Cold, Hury in Baldersdale, Gorple, Hornsea Mere—from all of these sheets of water Goldeneyes in small numbers have been recorded in 1948 ; and also from the river Wharfe. At most of them the species was usually present. 16 at Swillington on November 6th (F.R.A., D.L., K.D.), 13 at Gouthwaite on March 21st (R.C.), 11 at Lindley on April 3rd (M.F.M.M.), 10 at Eccup on November 6th (R.F.D., P.E.D.) ; and about 24 at Swinsty on November 9th (Mr. Edmondson), with up to 30 at Hornsea Mere on March 6th (E.C.), are the maximum numbers. At Lindley four birds stayed until May 1st, and a redhead was still there on May 12th (M.F.M.M.). Three on October 9th at

Hury Reservoir, Baldersdale (A.B.) were the earliest recorded in autumn. A drake was seen on the sea from Cloughton on December 26th (E.W.T.).

334. Long-tailed Duck.—There was a drake on Peasholm Park Lake, Scarborough, from October 31st to November 2nd (A.J.W.).

339. Common Scoter.—The largest numbers recorded at Spurn, where smaller parties were seen not infrequently, was *c.* 50 on September 11th (G.R.E., etc.). 80 flew south off Hornsea on July 18th (P.W.P.B.). Cross-Pennine migration was perhaps the cause of 48 drakes and two ducks at Eccup on July 11th. Twice they dived simultaneously and surfaced practically together (K.B.). Two drakes and a duck were on Redmires Reservoir, Sheffield, on April 19th (E. Ward); four drakes and two ducks at Eccup on May 30th (K.B.). Common Scoters were seen regularly in small numbers in autumn and winter at Teesmouth, with about 100 there on September 5th (A.B.).

340. Velvet Scoter.—Off Hornsea on September 21st a Velvet Scoter left a party of Common Scoters to join some Mallard (P.W.P.B.).

342. Goosander.—Birds were seen on Hornsea Mere by E.C., P.G., and H.O.B. from January 7th to April 10th consisting usually of one or two drakes to five ducks or immature birds (G.H.A.). At Eccup Reservoir, where birds were usually present, numbers were larger, with 19 there on February 1st (M. and S.B-S.); last recorded there in spring on April 14th (J.H.E.). Smaller numbers more occasionally occurred at Roundhill Reservoir, Swinsty, Ilton, Swillington Ing, Wintersett, Lindley, Fewston, and Hury. At Coniston Cold, 17 occurred on January 31st and February 2nd (R.T.). A duck at Hury Reservoir on October 9th was the first recorded in autumn (A.B.).

343. Red-breasted Merganser.—A duck was seen at Eccup Reservoir on November 10th, and two on December 23rd (M. and S.B-S.). There were six drakes and seven ducks at Hornsea Mere on March 1st (Miss B.S.). A party of ten birds were seen in flight from Cloughton on December 26th (E.W.T.).

344. Smew.—At Hornsea Mere a drake was seen on January 24th, and two ducks on February 14th (E.C., P.G.), with a duck on February 15th (H.O.B.). Birds also occurred at Gouthwaite Reservoir, a brownhead on February 29th to March 27th (R.C.), and two on December 22nd (A.G.W.); at Ripley Park two birds on January 6th (K.I.), and one on December 5th and 19th (A.G.W.). Single males were at Swillington Ing on February 11th (K.D.); and on Lindley Reservoir on March 7th.

346. Cormorant.—30 to 40 pairs bred on the Boulby Cliffs, which was more than in 1947, but fewer than in 1946 (R.S.). 36 nests were counted on Hunt Cliff, Saltburn, as far as the first headland (A.B.).

348. Shag.—A bird occurred at Teesmouth on September 5th (A.B.).

349. Gannet.—Two pairs reared young at Bempton (Bob Artley per C.F.P.). On May 29th, A.J.W. saw four birds, and was told by the 'climbers' there were three nests, one already holding an egg. C.H.W. saw three birds on June 5th, one on a nest; and A.F.T. watched two birds frequently displaying on a nesting ledge on the 6th. On the 19th E.C. saw a bird carrying seaweed. C.F.P. saw a bird leave the Oven Rock on June 26th. A.P. saw three birds on July 22nd, one on a nest and another rubbing beaks with it. Early in August M. W. Booth and G. Murdock found a young bird at the base of the cliffs on the south side of Flamborough which flew about 25 yards.

A first winter bird came down near Bradford on September 25th. It was taken to the R.S.P.C.A. clinic in Bradford and subsequently cared for by R.F.D., ringed, and released from Castle Cliff, Scarborough, whence it flew strongly out to sea. Gannets, adult and young, were noted as usual passing down the coast in autumn with October 14th as the latest date (G.R.E.). 13 Gannets were close inshore between Filey Brig and Cayton Bay on December 27th; seven flew south, two flew north and four were fishing (A.J.W., D.W., B.W.).

355. Manx Shearwater.—Odd birds were reported at Spurn on September 18th and 19th (D.A.T.M., M.R.K.P., H.O.B.).

360. Great Shearwater.—Two Shearwaters almost certainly of this species were seen off Spurn on October 3rd, and one on October 12th (G.R.E., A.M., etc). They were 'brown above, white below, had white cheeks and were as large as Gannets.'

368. Fulmar.—14 birds sitting on Hunt Cliff, Saltburn, were counted as far as the first headland on June 27th (A.B.). Birds were seen sitting on many parts of

the Yorkshire cliffs as far south as Sewerby Cafe, where five birds were about the cliffs on January 25th (F.W.) ; but no egg or young bird was recorded. Eight birds flew singly and south at Spurn on September 4th (J.L., G.H.A., A.B.W.).

370. Great Crested Grebe.—In the early part of the breeding season about 80 birds frequented 18 waters, and about 30 pairs bred, not all successfully ; but young of at least 18 pairs were seen later and possibly there were more. Several nests were stranded by drops in water levels.

371. Red-necked Grebe.—A bird at Teesmouth on October 16th was accompanied by a Great Crested Grebe, than which it was smaller and shorter-necked, and without a white supercilliary stripe (A.B.).

373. Slavonian Grebe.—The ear-tufts of a bird at Malham Tarn on September 10th still showed yellow (B.S.).

374. Black-necked Grebe.—A bird at Chelker Reservoir on January 4th had a slightly uptilted bill, and the black cap continued in a broad line down the nape. Its movements were followed by Black-headed Gulls (W.F.F.). It, or another, was seen there on January 16th (R.F.G.), February 1st (W.F.F.), and on February 12th (P.J.B.). Birds occurred at Swillington Ing, a male in breeding plumage on April 24th and May 1st, with single birds on several dates up to August 28th (K.D., F.R.A.). On August 20th there were seven (B.S.) ; on the 27th two adults (F.R.A.). At White Holme Reservoir an adult and two young were seen on August 22nd (H.Z.G.).

375. Little Grebe.—Although in process of recovering its former numbers the species is considerably less numerous than before 1947.

376. Great Northern Diver.—A bird off Teesmouth on December 19th was impressively larger than a redthroat, and had slight remnants of summer plumage, and a down-curved upper mandible (A.B.).

378. Black-throated Diver.—Two birds were at Spurn on April 14th (R.F.D., K.F., F.R.A., L.R.) ; and probably some of the other divers that passed down the coast in autumn were of this species.

379. Red-throated Diver.—Birds occurred at Hornsea Mere from January to May 10th (E.C., B.S.). There were three off Spurn on January 3rd (G.R.E.) ; and birds were noted from October 5th to 20th with seven on the 14th (G.R.E., A.M., R.R.). Other divers noted on various dates in September and October, too far out for certain identification, were probably most often of this species.

A bird on Rivelin Dam, Sheffield, from March 26th to April 1st was in almost full breeding dress (A.F.T.).

At Teesmouth, last seen on April 8th, the first summer-plumaged bird occurred on March 7th. Off Staithes, the first bird of autumn occurred on September 18th, after which many were seen off Teesmouth, including one still in summer plumage on October 17th (A.B.).

380. Wood Pigeon.—A bird ringed at Blagdon (Northumberland) on August 4th, 1947, was recovered at Thirsk on February 13th, 1948 (E.P.L. in *British Birds*).

381. Stock Dove.—26 fed at High Royd Sewage Works from February 17th, increasing to 30 before leaving on March 3rd (H.Z.G.). The first egg in a nest in a rabbit-hole in Stapleton Park was laid on March 28th (P.B.). A young bird, fallen from a nest near Apperley Bridge, was hand-reared and ringed on June 20th 1947, and shot near Boroughbridge on February 20th, 1948 (R.F.D.). The song was heard at Thornton Dale on eight dates between December 10th and 28th (R.M.G.) ; and can often be heard at Rowley on frosty mornings, as on December 27th (D.C.U.).

382. Rock Dove.—About 50 per cent. of the feral birds along the cliffs near Boulby are true to type ; the remainder show many variations (R.S.).

383. Turtle Dove.—First noted on April 24th near Hotham (E.B.B.). Has been noted by keepers around Loftus for many years (R.S.). More birds than usual breed around Helmsley (A.G.) ; but the species was scarce about Methley where often common (P.B.). At Esholt, Airedale, an empty nest and the remains of a young bird were found (R.F.D.). About 30 pairs nested in the spruce woods about Strines where it was first noted on May 10th (K.W.). There was a pair in woodland below Ilton Moor on May 7th (P.Y.). Two were noted at Spurn on May 17th (G.H.A., T.B.D.). Two birds in Moseley Wood, Cookridge, on October 24th were late (F.R.A.).

386. Bar-tailed Godwit.—The species was strangely infrequent at Spurn this year with ten as the maximum in spring on March 27th (G.H.A., H.G.B.), and the latest, an odd bird on April 27th (A.L.C., G.H.A.). In autumn August 14th was the earliest date, and ten on September 3rd, the largest number recorded (A.B.W., N.F.E.). Things were very different at Teesmouth where about 60 usually winter ; and there were 32 on Redcar sands on May 2nd, with numbers at Teesmouth usually in excess of 100 on various dates from August 15th (*c.* 400-500) to November 27th (A.B.).

387. Black-tailed Godwit.—Single birds were at Spurn on May 5th (R.C., J.R.), and September 2nd (E.C., J.W., A.B.W.). And an odd bird was at Swillington Ing on May 1st (D.L.). 22 birds flew south near to Osmotherley on September 14th calling as they passed (J.P.U.).

388. Curlew.—At Teesmouth there were about 300 on March 7th and 20th, with *c.* 100 on August 31st and November 6th (A.B.).

389. Whimbrel.—On May 9th a bird flew over Hawksworth Moor calling repeatedly (R.F.D.). There was a bird at Wintersett on May 19th (J.H.) ; and one near Newbold on October 14th (D.C.U.). The species was heard among Curlews at Malham on July 23rd (P.F.H.). It is a regular passage migrant in small numbers at Teesmouth—May 9th, five ; August 2nd and September 5th, three (A.B.). At Spurn first observed in spring on April 15th (R.F.D., F.R.A.) and with maximum seven on May 1st (E.C., A.L.C.). In autumn the maximum was 34 on August 19th (R.M.G., G.H.A., M.H.) ; and it was last noted on October 19th (R.C.).

393. Woodcock.—A bird rose from newly-hatched young on Cronkley Fell on July 8th, at an altitude of 1,750 ft. The site was below dead branches of stunted juniper growing on ' sugar limestone ' outcrop (per G. W. Temperley).

A bird was ' roding ' at Ilton on March 5th (P.Y.), but first noted over Malham Tarn House on April 20th (P.F.H.). At Fewston, on May 22nd, a Woodcock rose carrying a chick between its legs, flying very labouredly for about 100 yards before dropping ; about halfway the tail was dropped and fanned out as support for the chick of which the bird seemed to be losing grip (M.F.M.M.). At Spurn a few birds came in from October 9th with six noted on October 30th and 31st (R.C., G.H.A., R.B.). Five birds flying over Filey on November 3rd were headed seaward (H.J.R.P.).

[394. Great Snipe.—L. Broome described a large Snipe at High Royd on July 24th with conspicuous white in the tail feathers. P. Young saw a Snipe on Ilton Moor on December 1st which seemed larger than a Common Snipe and had a different flight, which he believed to be a Great Snipe.]

398. Jack Snipe.—Birds occurred on Ilton Moor on February 7th and November 28th (P.Y.). There were two at Elland S. Works in November and December (H.Z.G.). The species had arrived at Keld Head, Pickering, by September 29th, where eight were flushed on October 21st (R.M.G.). At Spurn single birds occurred on April 14th (R.F.D., K.F.), and 24th (R.C., G.H.A.) ; and on October 6th (G.R.E., A.M.) and 21st (A.L.C., R.C.) ; and one was picked up dead under the lighthouse on November 14th (A.H.W., G.H.A.).

400. Grey Phalarope.—At Bridlington on November 7th, three grey, dunlin-sized birds swam 20 feet from the edge of the tide, with typical buoyancy and jerky movements. They were very tame, and had short, rather flat bills (F. Wilcock).

402. Turnstone.—A bird occurred at Swillington Ing on August 14th (K.D.). Small numbers winter at Teesmouth but the largest number were seen on August 31st—41 birds (A.B.). At Spurn the maximum was *c.* 100 on August 16th (R.M.G., G.H.A., M.H.).

403. Knot.—At Teesmouth numbers averaged about 200 from August to December (A.B.). A similar number occurred at Cherry Cob Sands on October 9th (R.H.). At Spurn, *c.* 800 during the second and third weeks of October was the largest number recorded.

404/405. Dunlin.—Almost always present at Swillington Ing in numbers varying from one or two to 40 (August 7th, K.D.) ; and on various occasions at Wintersett (J.H., J.R.). The species bred on Widdale Fell—two eggs on May 15th (R.B., F.C.G.) ; and on others of the Pennine moors. At Teesmouth, *c.* 400 on November 27th and December 12th was the maximum reported (A.B.) ; at Spurn *c.* 1,000 on October 9th (G.R.E., W.F.F.).

406. Curlew Sandpiper.—Single birds were noted at Spurn from August 14th to 31st, and on September 17th (K.T.M., M.R.K.P.). A slender graceful bird in a field near Northallerton on September 23rd was slightly larger than a Dunlin, and had a white rump and eyestripe, and decurved bill (J.P.U.).

407. Little Stint.—There was one at Swillington Ing on August 20th (B.S.) and one at Dewsbury S. Farm on September 8th in company with two Dunlins (J.C.). A bird was noted at Spurn on October 29th (E.C.).

[411. American Pectoral Sandpiper.—Two birds at Leeming Reservoir for some days in early spring were thought to be of this species by A. W. A. Swaine. Unfortunately shortage of petrol prevented corroborative visits.]

415. Purple Sandpiper.—Birds were noted at Filey Brigg and at Bridlington, on various dates. At Spurn single birds occurred on April 15th (R.F.D., F.R.A.), on Septemuer 16th (D.A.T.M.) ; and on October 21st (A.L.C., R.C.) and two on August 8th (H.O.B.). At Teesmouth there were two on May 9th, five on September 26th, and two on October 23rd (A.B.).

416. Sanderling.—Birds occurred inland, three at Swillington Ing on May 22nd (K.D., F.R.A.) ; three at White Holme Reservoir on August 17th (A.M.) ; two at Semerwater on August 5th (A.B.) ; and one at Wintersett on May 17th (J.R.). There are usually a few at Teesmouth with a big influx in spring and autumn—*c.* 150 on May 2nd, *c.* 100 on September 5th (A.B.). At Spurn the maximum was *c.* 100 on March 31st (H.G.B.).

417. Ruff.—Inland, birds were noted in spring at Swillington Ing, two from March 21st to April 11th (K.D., F.R.A.) ; and in autumn two on August 20th (B.S.), and 22nd (K.D.). At Ossett S. Farm birds were usually present from August 2nd to September 18th, with five on September 3rd (J.C.) ; and at Dewsbury S. Farm there were 17 on August 18th, with 16 on the 20th and 23rd (J.C.). One at Ripon S. Farm on August 6th ; and two males there on August 21st, and for some days after, were very tame (R.C.). At Burley Sewage Farm one occurred on August 18th (C. Nelson, J. Carr).

Ruffs occurred at Spurn, three on August 15th and 16th, and an odd bird from August 17th to 19th (R.M.G., G.H.A., M.H.) ; and one on September 17th (K.T.M., M.R.K.P.). There were nine birds on Cherry Cob sands on September 1st (H.O.B.), and single birds at Hornsea Mere, and Brandesburton, on September 11th (P.W.P.B.).

421. Common Sandpiper.—First occurrence, Eccup Reservoir on April 10th (K.B.) ; and last seen, again at Eccup, on October 17th (M. and S.B-S.).

424. Green Sandpiper.—January 4th at Swillington Ing (V.S.C., I.M., F.M.) ; March 18th and 20th, and April 15th all near Ilkley (H.M., W.F.F.) ; March 18th at Swillington Ing (P.B.) ; April 10th at Bottomboat, Wakefield (J.R.) ; and two at Eccup from November 14th to December 26th (K.B.) (also seen by D.L. and J.H.E.) with one still there on January 16th, 1949 (J.H.E.) and December 6th at Riffa (H.M.), are unusual dates in Yorkshire. In July and August birds occurred on various dates at Ripon Sewage Farm (R.C.), Harrogate Sewage Farm (K.I.), Denton Lake (H.J.W., J.A.C., W.F.F.), Ossett Sewage Farm and Dewsbury Sewage Farm (J.C.), Bretton (J.C.S.E.), Swillington Ing (K.D., F.R.A., B.S., and H.Z.G.), Eccup Reservoir (K.B.), and Ellerby Moor (R.S.) and near Ganton (A.J.W.). At Spurn, Green Sandpipers were last seen on September 4th (A.B.W., J.L., G.H.A.), with five on August 16th (R.M.G., G.H.A.).

428. Common Redshank.—The maximum number reported for Spurn was about 100 on September 29th (R.C., R.S.), and October 12th (G.R.E., W.F.F.) ; for Teesmouth *c.* 300 on September 5th (A.B.).

431. Spotted Redshank.—D. Leaver saw a bird at Swillington Ing on March 13th which showed all the characteristics of this species in winter plumage, with a Common Redshank present for comparison ; and was of opinion that three birds he had seen there on March 6th, and a second bird on the 13th, were also Spotted Redshanks.

432. Greenshank.—Birds were recorded from July to October at Swinsty Reservoir, Ossett Sewage Farm, Dewsbury Sewage Farm, Ilton Reservoir, Ripon Sewage Farm, Swillington Ing, Teesmouth, Ben Rhydding Filter Beds, High Royd Sewage Farm, Eccup Reservoir, Blackstone Edge Reservoir, Semerwater, Lindley Reservoir, Hornsea Mere, Brandesburton Gravel Pits, and Spurn, numbers varying from one to four.

435. Ringed Plover.—Nested as usual at Spurn and Teesmouth where most were robbed. Flocks at Teesmouth in spring reached maximum with *c.* 150 on May 9th, and in autumn with *c.* 100 on September 5th (A.B.). At Spurn the maximum was *c.* 100 on September 11th (R.F.D., G.H.A.). Occurred in small numbers by inland waters on various dates.

438. Little Ringed Plover.—A pair bred in the West Riding for the first known time in the north of England. Observation by K.D., F.R.A. and D.L. culminated in the discovery of a nest with four eggs by R.C. on June 8th, which subsequently disappeared. On July 18th, K.D. and F.R.A. found two young, about two days old, evidently from a second laying. (For details see *British Birds*, 1948, pp.384-385.)

440/441. Golden Plover.—Birds were plentiful in the Vale of Pickering from January to March, some with black faces on March 29th being considered to be of the Northern race (R.M.G.). On Harrogate Stray *c.* 600 to 700 were present on January 31st ; and in autumn *c.* 70 on September 23rd increased to *c.* 800 by November 18th, fluctuating between *c.* 200 and *c.* 400 in December (A.G.W.). In Wharfedale at Pool on February 12th there were *c.* 500 (P.E.D.); and near Otley on April 12th and other dates, *c.* 400 of which at least 50 per cent. were typical of the Northern race (G.K.Y.). Near Strines, where a pair of local breeders had four eggs on May 1st, flocks remained until the end of April (K.W.). A pair above Reeth had small young on April 27th (R. Whitlock).

In autumn, c.100 at Blackmoorfoot on September 24th (J.C.S.E.); *c.* 200 at Redmires, Sheffield, on October 17th (A.F.T.); near Leathley c.250 on September 6th (J.E.B.) ; several hundreds at Fly Flatts in November and December, and *c.* 125 at Gorple (H.Z.G.) ; and large flocks around Beverley in December including one of *c.* 500 (G.H.A.) ; were notable.

444. Grey Plover.—At Teesmouth the maximum was *c.* 150 on August 31st (A.B.). At Spurn, the maximum number, *c.* 200, occurred on October 9th (G.R.E., W.F.F., etc.) ; when there were *c.* 20 on Cherry Cob sands (R.H.).

449. Lapwing.—' Virtually ceased to breed ' in the Bretton area (J.C.S.E.) ; scarce near York (B.D.) ; and decreases continue near Northallerton (J.P.U.), on the lower ground near Masham (R.C.), and near Strines (K.W.) ; but not around Ilkley (W.F.F.). There were *c.* 500 in one field at Cottingham on January 30th (E.C.). Many flocks, totalling to several thousand birds flew south and west over Clifton Ings, York on February 1st (R.H.). Very large flocks occurred in December—Selby, *c.* 1,000 on the 19th (P.A.H.) ; *c.* 500 near Methley on the 22nd, *c.* 1,000 on Gorsepool Aerodrome on the 12th (A.B.) ; *c.* 500 near Methley on the 22nd (P.B.), *c.* 1,000 near Beverley on the 24th, and *c.* 1,000 to *c.* 2,000 around New Earswick (F.J.). It is probable that most of these birds were winter visitors ; as would be the case with the large-scale passage to south and south-west noted by H. J. R. Pease near Filey in mid-November.

452. Oystercatcher.—Calls were heard after dark at Skipton on March 3rd, and at 2 a.m. on the 4th (A.T.). Breeding occurred in Upper Airedale (A.T.), and in Ribblesdale (J. J. Boon), and possibly elsewhere. Odd birds occurred at Hawes on May 9th (R.B., F.G.C., J.S.G.) ; at Ilton Reservoir on July 22nd and August 8th (P.Y.) ; at Swillington Ing on August 5th (F.R.A.) ; at Slaidburn on June 12th (F.R.A.); one at Coniston Cold on April 2nd and October 3rd (R.T.); at Semerwater on August 3rd (A.B.) ; at Kilnsey on June 19th ; and two at Castley on April 4th, and one on June 7th (H.M.).

A bird summered at Teesmouth where it is a common passage migrant, with *c.* 80 there on September 5th (A.B.). At Spurn two pairs nested and were robbed; *c.* 90, May 1st to 5th (R.C., A.L.C.) was the greatest number seen there in spring, with only a few birds there in autumn (G.H.A.). A few birds were seen several times in summer under the Saltburn to Skinningrove Cliffs (A.B.).

461a. Demoiselle Crane.—*Anthropoides virgo* (L.). On September 12th, from the Long Bank near Kilnsea, a large bird was noticed flying with some Rooks. At first thought to be a Heron, it was then noticed that the head and neck were fully extended and the flight different. It was marked down in the dyke eastward nearer to the sea, and approached to within 150 yards. Detailed description and sketches were taken on the spot. The bird was evidently a crane, a grey and black bird, with conspicuous tufts of white feathers growing from behind the eye. Although taking wing several times it did not fly far, and was within easy view of binoculars for about three-quarters of an hour ; eventually flying towards the

place where first seen. R. Clubley reported the bird to have frequented the Humber shore for more than a week previously. Enquiry by advertisement and radio for news of a Demoiselle Crane that might have escaped from captivity evoked no response (E. M. Rutter, H. O. Bunce).

462. Black Tern.—West Riding records were all in May. On May 17th there was a bird (male) at Eccup Reservoir (K.B., J.H.E.) ; and four at Gouthwaite (A. Pilkington). On the 18th, nine hawked flies off the river near Ilkley (K.B.) ; and nine were seen at Gouthwaite Reservoir (A.P.) ; five were seen at Eccup (K.B.) ; eight at Malham Tarn (P.F.H.) ; four at Swillington Ing (K.D., H.Z.G.) ; and two at Coniston Cold (R.T.). On the 19th four passed easterly at Eccup (J.H.E., K.B.) ; 11 were seen at Wintersett Reservoir, only three of which had full black chests (J.C.) ; six occurred at Bottomboat, Wakefield (B.S.) ; and 18 at Malham Tarn (P.F.H.).

At Spurn a bird moved northward on August 15th (R.M.G., G.H.A., M.H.) ; and two moved south on September 10th (R.B., F.C.G., R.F.D.), and again on the 11th (G.H.A., E.M.R.). There was a juvenile at Hornsea Mere on September 14th (P.W.P.B.).

466. Caspian Tern.—Near Battery Point, Teesmouth, a Tern with a heavy, coral-red bill was between Black-headed Gull and Herring Gull in size (J.P.U.).

467. Sandwich Tern.—At Spurn was first seen on May 3rd (R.C., J.R.) ; and last noted on October 15th (G.R.E., A.M., R.R.) ; with maximum movement from September 6th to 9th, and *c.* 50 as the largest number seen in one day. Passage migration at Teesmouth was similar ; maxima ten on May 9th, and on August 31st (A.B.).

469/470. Common and Arctic Terns.—First noted at Teesmouth, two Common, on May 2nd (A.B.) ; and at Spurn on May 5th (R.C., J.R.), where last noted on October 2nd (G.R.E., A.M.), maximum *c.* 40 on September 27th, mostly Arctic (R.S., R.C.). At Teesmouth the maximum was *c.* 150 on August 31st, and the last a single bird on October 16th (A.B.).

Inland occurrences were : at Chelker Reservoir, three on May 4th, and three on June 15th (K.C.C.) ; one at Wintersett on May 19th (J.H.), and one on June 4th (J.R.) ; at Swillington Ing one on June 9th and four on June 27th (K.D., F.R.A. and H.Z.G.) ; at Eccup Reservoir one on July 3rd, two July 10th, three on August 26th, and one on September 19th (K.B., M. and S.B-S.) ; at Semerwater one on August 5th (A.B.) ; and one occurred near Mytholmroyd on September 21st (F.D.), and one at Gouthwaite on the 20th (P.Y.).

471. Little Tern.—First noted at Spurn in spring on April 19th (M.H.). Picnic parties with their children and dogs kept the birds off their eggs on many days, and high tides destroyed many eggs. The birds breed in several colonies, and only at the farthest were a few young birds seen. Of 19 nests examined on June 19th 16 had three eggs and three had two eggs (G.H.A.). 21 birds flew above their nesting site at Teesmouth but no young were seen, and probably none reared (A.B.). Last seen at Teesmouth on August 31st (A.B.) ; and at Spurn on August 29th (E.C., H.O.B.).

476. Bonaparte's Gull.—K. Dawson and F. R. Allison recorded one at Swillington Ing on February 11th, 1948, basing diagnosis on size compared with Black-headed Gulls, long narrow wings, black bill, and dark satiny head of slate-grey. (For details see *British Birds*, Vol. XLI, pp. 276-7).

477. Little Gull.—Three immature birds were seen at Spurn on September 10th (R.B., F.C.G., R.F.D.), and one on October 2nd (R. Hewson), and October 10th (G.R.E., A.M.).

478. Black-headed Gull.—Roosting at Eccup on February 29th were *c.* 8,000 to 10,000 birds (K.B.). More than 100 pairs nested at the Rotherham Sewage Works and young were seen. The site was a dry bit of ground islanded in mud. One bird trapped in the mud struggled for half-an-hour before pulling itself forward and out, exhausted and muddy (R.B., W.H.B.).

481. Common Gull.—The largest number reported at Eccup was *c.* 600 on October 6th (M. and S.B-S.).

482/483. Herring Gull.—A bird found dead at Eccup Reservoir on November 21st was identified as of the Scandinavian race by R. Wagstaffe (K.B.). Numbers at Eccup reached *c.* 200 on January 11th (K.B.) ; and at Swillington *c.* 150 on February 11th (F.R.A.). Herring Gulls again bred on house roofs at Whitby (C.E.A.B.).

484/485. Lesser Black-backed Gull.—There were about 250 adults at Eccup Reservoir on April 26th ; on May 12th of *c.* 100 birds almost all were immature. Four birds at Swillington Ing on February 1st had mantles as dark as primary tips ; a few of the British race were also present (K.D.). From July to the end of October numbers at Eccup ran into hundreds, dwindling thereafter, and on December 12th only one remained (K.B.). Birds of the Scandinavian race were seen at Spurn on September 25th, and on the 29th (W.R., A.R.S.) in company with birds of the British race.

486. Great Black-backed Gull.—*c.* 40 at Swillington Ing on January 18th was the largest number seen inland. There were 13 on manure heaps near Lofthouse, Wakefield, on December 28th (B.S.). A few birds occurred at other places. The usual considerable numbers passed down the coast from August onwards.

487. Glaucous Gull.—At Spurn only noted on April 29th (R.C.), and on December 12th (R.M.C.P.). An adult at Swillington on January 18th had wings reaching only to the end of the tail (F.R.A.).

489. Kittiwake.—The species continues to increase on the Bempton Cliffs (A.J.W.).

493. Arctic Skua.—A few birds were recorded at Spurn and Teesmouth in autumn, including seven dark birds and one light bird at Teesmouth on August 31st (A.B.). A dark bird was at Spurn on June 19th (G.H.A.) and one at Teesmouth on June 20th (A.B.).

498/499. Guillemot.—Three out of 300 counted at Bempton on July 18th were of the bridled variety (J.L.). A bird dead on the beach at Spurn on December 22nd was of the Northern race. Another was brought to R.M.G. alive on November 8th, but with one eye lost and damaged on side of face. It had been picked up outside Thornton-le-Dale, and was released next day at Scarborough.

501. Black Guillemot.—In the Todmorden area on February 2nd, 1948, a short-tailed bird, jackdaw-sized, flew fast down wind and appeared to come down in a distant field ; then almost immediately came back up wind with fast level flight to within 15 yards of S. Cockcroft, when the white patches on the short pointed wings were plain. The bird was in winter plumage with white head and mottled back plumage. It landed on a bank, but took off again with some difficulty, and disappeared westward (H.Z.G.).

502. Little Auk.—On November 6th the wind turned east for a few days with some fog on high ground, and probably interfered with movements of Little Auks about the North Sea, where a bird was seen off Teesmouth (A.B.). On the 7th small parties of up to 30 birds were flying north all morning near Filey Brig, and others swam on the sea (A.J.W., D. Wheatley and B. Wood) ; and C. H. Wells watched 11 swimming through the breakers. On the same day two alighted on Swillington Ing for a few minutes (B. Mitchell) ; one was flushed during a shoot at Blaxton, near Finningley and collided with a wire (Dr. Court per L. Carr) ; and one was caught alive in a tree at Southowram (R. Naylor, H.Z.G.). On the 8th three birds flew past the Scarborough Marine Drive (A.J.W.) ; one was found in a garden at Baildon (E.H.) ; and one from Haworth was sent to the Keighley Museum (E.H.). On the 9th one was picked up on Otley Chevin (W.F.F.). On the 10th, a bird found dead in a field at High Flatts, near Penistone, was sent to the Yorkshire Museum (E. W. Aubrook, E.W.T.), and a bird reached the same museum from Mr. J. B. Fay of Hull (E.W.T.). On the 11th a dead bird was found on a moor near Halifax (G. Dent).

504. Corncrake.—Birds have been heard, and in some cases seen—near Mytholmroyd on May 21st and for three days after (F.D.) ; in Upper Swaledale on May 20th (J.P.U.), near Hawes on May 17th (R.B., F.C.G.) ; between Fewston and Pateley in June (A.G.W.) ; near Rotherham on July 22nd (C. Lilleyman) ; near Sheffield on June 23rd and on most evenings thereabouts (A.F.T., C.H.W.) ; in Wensleydale on August 31st (Lord Bolton) ; near Sandsend (A.B.W.) ; near Liverton Mines on May 31st (R.S.) ; in Bilsdale on May 30th (C.E.A.B.) ' Corncrakes have never ceased to appear hereabouts, but of recent years have diminished in number ' (local farmer). A pair bred near Keighley, all but two of the young being killed by the reaper (A. D. Bateman). A bird was flushed from clover at Wiggington on September 18th (F.J.).

505. Spotted Crake.—On Malham Moor from June 13th to 20th, a bird called its unmistakeable note almost continuously from dusk to dawn (P.F.H.).

509. Water Rail.—A pair bred in lower Swaledale, four young being seen

(J.P.U.). An adult that had apparently crashed into an Aire railway bridge or into wire was picked up on September 29th on Woodhouse Grove playing field, Apperley Bridge (R.F.D.). Birds also occurred at Scarborough Mere in late October and November (A.J.W.) ; at Spurn on November 14th perching in buckthorn (A.H.W.) ; near Melbourne, squealing at mid-day on December 4th (F.J.) ; at Coxley, seen and heard on December 24th (J.C.) ; at Burley-in-Wharfedale (W. Flesher), and near Maunby, Thirsk (B. Foggitt), both on December 27th.

510. Moorhen.—Having reared two broods, a third clutch came to grief, but the fourth was hatched by a pair near Mytholmroyd (F.D.) on August 2nd.

511. Coot.—Winter congregations included *c.* 150 at Hornsea Mere on March 6th, *c.* 100-150 at Fairburn on February 1st (K.B.); *c.* 100 at Wintersett on February 1st (J.H.) ; *c.* 300 at Newton Ing on September 30th (M. and S.B-S.).

513. British Black Grouse.—Of two pairs near Strines one had young on June 20th (K.W.) ; and breeding is reported in the Slaidburn area (A.P.). Birds were seen—four in Upper Swaledale on May 19th (J.P.U.) ; one on Great Shunner Fell on May 31st (Dr. Radford) ; and odd birds near Masham on January 10th and November 30th (P.Y.).

517. Pheasant.—A nest of 10 fresh eggs near Baldersby on September 10th were taken home by a roadman for cooking after he had sampled one raw (J.P.U.).

519. Red-legged Partridge.—At Melbourne, in one small area, three good coveys were seen (B.D.).

520. Quail.—A nest with eight eggs was mown over at Newstead Grange Farm, Vale of Pickering, in July ; and was believed to be already deserted—no bird was seen (R.M.G.). A bird was heard near Boston Spa in June (K. M. Lewis) and near Hotham on June 12th (E.B.B.). A nest of ten eggs was found near Wakefield in mid-September by a farmer when mowing aftermath (M. B. Harvey, *Gamekeeper and Countryside*).

NOTES ON THE WATER SHREW

FRED DEAN

As I have spent a number of years watching shrews, I venture these notes on the Water Shrew.

Even when the dams and ponds are covered with ice, Water Shrews may be found searching for food below the icy covering, for shrews are active all the year round.

On January 3rd, 1947, I found a place at the head of a dam where the inflow of water had prevented a complete freeze-up. It was a bitterly cold day, an east wind lashing the water's surface, yet a number of Water Shrews were busily searching for food at the bottom of the dam. Owing to the disturbance of the water, and the remarkable speed of the shrews, it was difficult to count them, but six to eight would be perhaps a fair estimate. When below the surface, these creatures resemble streaks of silver rather than moving animals. The air bubbles which cling to their soft fur serve the dual purpose of giving them bouyancy and of keeping their undercoats perfectly dry.

Mostly they kept as far from each other as space would allow, but if by accident a shrew drew too near to its neighbour it was immediately warned off by intricate movements of the head and front feet. This was obviously a threat and was never ignored.

With the thawing of the ice, the shrews wandered off again to their favourite hunting places by the dam sides. These are usually under some convenient overhanging undergrowth. In this place heather and ferns were ideal for shelter and covering. The darkness of the water from the shade overhead tends to obscure the shapes of these dark-coloured water sprites, so much so that if it were not for the rings made on the water by their surfacings and divings, they would often be passed unnoticed.

During February and March there was little change in their general habits but by early April there was more energy than ever in their movements. A wide area is covered by the males in searching for mates (April 11th) in which their sense of smell plays an important part. Their activity is now remarkable. Every bank on both sides of the dam is eagerly searched and researched until a female

is encountered. My first record of actual mating was April 20th. Actual coition lasts but a matter of seconds and is oft repeated.

In my previous notes I alluded to the constant fighting of the males. They seem to hear and see only other shrews, ignoring all other dangers. These fights are only a matter of seconds, each animal jockeying for a throat-hold. Whilst the fight is at its height these combatants can be picked up, but if they can get at one another they will still continue the fight. Without any tiring they dash about, always at speed, swimming, diving, searching ; there is no slackening. An observer is forced to marvel at their remarkable vitality.

The females appear to leave the preparing of their cup-shaped nests to the last few hours of their pregnancy. If an observer be lucky, he may see them busily engaged collecting mouthfuls of selected dried grasses, moss, or other soft herbage. Time seems of great importance as they swim backwards and forwards to and from their chosen nesting sites with tufts of nesting material. Whether their bedding is wet or dry seems of no consequence, for quite often the females will dive under water with their supplies and enter some under-water entrance hole.

As the males and females are very much alike in size and colour markings, it is sometimes difficult to tell which is which, but I doubt whether any female would allow a male shrew to enter, or even come near her nesting site.

To watch these efforts of the female, any would-be observer must remain motionless, for on the slightest sound or whiff of the tell-tale scent of any intruder all activities instantly cease. When these creatures dive is the time to take a step or two nearer to them, always, of course, keeping one's shadow off the water. One can repeat this movement until the desired position is reached, and then can lie down and watch their activities from a distance of only a few feet.

At this distance, you can hear the faint ' plop ' as the Water Shrew dives. A few tell-tale rings will be seen on the water's surface and, down below, almost dart-like, will be seen a silvery streak speeding down to the bottom of the dam. Once there, the long sensitive nose and front feet are brought into use, seeking out the dainty morsels beneath the sodden decaying leaves.

Often the shrew completely buries itself in this debris, vanishes and comes to view a foot or two away. If the search for food has been successful, it comes up at an alarming burst of speed, the momentum of which brings the shrew a few inches higher up the bank than was intended, such is their buoyancy. If unsuccessful, the search still goes on, until two or three places have been tried. Should the shrew be now a few yards from the bank it immediately surfaces, dives again after taking breath and comes up as before. On the very instant of landing, the shrews shake themselves and in a trice their coats are perfectly dry.

If a close watch be kept, it is possible to see what has been collected. More often than not, this will be the casing of a caddis fly larva, carried cross-wise in the mouth, the contents to be eaten when the shrew is under cover.

A few consecutive dives in the same place, and the shrew moves a yard or two up the bank and repeats the performance. As the period of submersion is normally between five and seven or eight seconds (nineteen seconds is my longest recorded period) some idea of the quickness of these under-water movements may be judged.

All their life seems one continual hurry. They die off in the second autumn of their active lives, unmoulted. A short life but a full one.

It must not be assumed that Water Shrews can only be found near water, for quite often in summer and autumn I have found them in dry areas at altitudes varying between a few hundred and a thousand feet, far from any waterways.

A Short History of York, by **Marguerita Spence** and **Marian Everatt.** Pp. 120 with 40 photographs and line drawings. A. Brown & Sons, Ltd., 7/6.

This pocket history is dedicated to the boys and girls of York and in the foreword the Rev. Chancellor Harrison correctly describes the contents as continuous, exciting, accurate, picturesque and all-too-short. The story commences in the Eboracum of A.D. 71 and proceeds through the Anglian and Danish periods to the Conquest ; thence through the three and a quarter centuries covering the medieval to the times known successively as Tudor, Stuart, Georgian and Victorian to the present. The reader is admitted to the atmosphere of the periods described and the story is supported by well-chosen photographs and line drawings, the latter prepared by the second authoress. This volume is recommended to all who visit or love the ancient City of York and should not be restricted only to boys and girls.—E.W.T.

THE FUNGUS FORAY AT MASHAM

W. G. BRAMLEY AND JENNIE GRAINGER

THE sixty-fifth Autumn Foray was held at Masham from September 24th to 28th, 1948.

Last year (1947) produced an exceptionally dry late summer and autumn, and it was thought that in a normal year Swinton would yield good gatherings of the typical beechwood fungi, especially species of *Cortinarius*.

The floor of the beechwoods, however, proved surprisingly dry and no more than six species of *Cortinarius* were noted during the whole foray. In contrast to last year more *Russulas* were seen, but the full effect of the wetter season was seen in the old pastures which yielded thirteen species of *Hygrophorus*, most of them represented by numerous individuals. In 1947 only three species and few individuals were noted. Of special interest were the numerous patches of the beautiful *H. calyptraeformis*. Mr. A. A. Pearson states that it is essentially a northern species, rarely found in the south and then not in profusion. He reported that it was seen in quantity near Belfast during the British Mycological Society's Foray.

Another contrast compared with the previous year's Foray was the almost complete absence of the Rust *Pucciniastrum pustulatum* on Rosebay Willow-Herb. Ergots were also scarce and this was especially noted on *Brachypodium* at Jervaulx which was visited by one of the authors after the Foray. Extremely little 'Mildew' (*Erysiphe polygoni*) was seen on Swedes. In 1947 it could be seen and smelt from some distance. On the other hand Blight was seen whenever potatoes were examined, in some cases very severe.

Once again we were much indebted to Mr. W. A. Thwaites for his valuable and indefatiguable services as guide.

The committee were delighted to welcome amongst them Miss E. M. Wakefield, of Kew, whose labours are reflected in the list of Resupinates in the accompanying list; also Prof. Manton and several of the staff of the Botanical Department of Leeds University. Finally, we have to thank all those who attended and helped to make the Foray successful. To Mr. Pearson and Miss Wakefield we are indebted for lists of the Basidiomycetes, to Mr. S. J. Hughes, of the Commonwealth Mycological Institute, and Mr. J. Webster, of Hull, for lists of Pyrenomycetes and Hyphomycetes.

The Agarics and Boleti are listed according to the 'Revised List of Agarics and Boleti' by A. A. Pearson and R. W. G. Dennis (*Trans. Brit. Myc. Soc.*, 31, 145-190).

H.=Hackfall. S.=Swinton. M.=Masham.
Q.=Quarry Ghyll. J.=Jervaulx. ‡=New to Britain.
* Not in Mason & Grainger's *Catalogue of Yorkshire Fungi* for V.C. 65.
† Not in Mason & Grainger.

Accession numbers are appended where applicable. These refer to the Herbarium of the Commonwealth Mycological Institute except where prefixed by H., where they are deposited in the Botany Department of Hull University College. A few, denoted by Y.P.S., are deposited in the Yorkshire Museum, York.

MYXOMYCETES

Arcyria cinerea Pers. Q.H.
A. incarnata Pers. J.S.
Craterium minutum Fr. S.
Fuligo septica Gmel. S.
**Diderma floriforme* Pers. M.
**D. radiatum* Lister. M.
Trichia affinis de Bary. S.
T. botrytis Pers. S.
T. decipiens Macbr. J. A form with extremely long elaters.
†*T. floriformis* G. Lister. S.
Tubifera ferruginosa Gmel. Q.

PHYCOMYCETES

**Bremia lactucae* Regel on *Senecio vulgaris*. S.
†*Peronospora alsinearum* Casp. on *S. media*. M.
**P. grisea* Unger on *V. beccabunga*. S.
P. myosotidis de Bary on *Myosotis sp.* S.
P. parasitica (Pers.) Tul. on *Capsella*. S.
P. violae de Bary on *V. Riviniana*. S.
Phytophthora infestans (Mont.) de Bary S.M.
Plasmopara pusilla (de Bary) Schroet. M.
**Syzygites megalocarpus* Ehrenb. on *Russula*. S. H710.

ASCOMYCETES

ERYSIPHALES

Erysiphe graminis DC., stat. con. on *Festuca pratensis*. M. 31545.

Microsphaeria grossulariae (Wallr.) Lev. M.

Sphaerotheca humuli (DC.) Burr. on *Epilobium hirsutum*. M. Y.P.S. and W.G.B.

**Perisporium vulgare* Cda. on sacking. M. H709.

Uncinula aceris (DC.) Sacc. on *Acer*. S. H720.

DISCOMYCETALES

Ascobolus stercorarius (Bull.) Schroet. H. H741b.

Cheilymenia dalmeniensis (Cke.) Boud. M.

**Chlorosplenium aeruginosum* (Oeder) de Not. S.H.

Ciliaria scutellata (Linn.) Boud. H. 31508.

**Coccomyces coronatus* (Schum.) de Not. H. H721.

Coprobia granulata (Bull.) Boud. H. H741a.

Coryne sarcoides (Jacq.) Tul. H.S.

Cyathicula coronata (Bull.) de Not. M. H733.

†*Dasyscypha brevipila* Le Gal. on *Prunus avium*. S. 31418.

†*Eriopeziza* (*Tapesia*) *caesia* (Pers.) Rehm. on *Quercus*. S. 31453.

Helotium citrinum Fr. H.Q. Y.P.S.

H. herbarum (Pers.) Fr. M. 31407c.

Helvella crispa (Scop.) Fr. S.

†*Hyaloscypha dermatiicola* (B. & Br.) Nannfeldt on *Fagus*. S. 31414a.

†*H. stevensoni* (B. & Br.) Nannfeldt on conifer wood. H. 31409b.

Leotia lubrica (Scop.) Fr. H.

Peziza aurantia Pers. S.

Polydesmia pruinosa (B. & Br.) Boud. on *Hypoxylon multiforme*. H. 31427.

†*Propolis versicolor* Fr. on *Fagus*. M. 32227.

Stegia ilicis Fr. S.

Trichoscypha calycina (Schum.) Boud. H.Q.

PYRENOMYCETALES—PHACIDIALES AND HYSTERIALES

Hypoderma virgultorum DC. on *Rubus*. Y.P.S. H700.

†*Farlowiella carmichaeliana* (Berk.) Sacc. on *Prunus avium*. S. H699c.

PYRENOMYCETALES—HYPOCREALES

Apiocrea chrysospermum (Tul.) Syd. H. (stat. con.=*Sepedonium*) on *Boletus*. 32230.

Claviceps purpurea (Fr.) Tul. on *Lolium*, S.

**Hypomyces aurantius* (Pers.) Tul. on *Polystictus*. J. stat. con. on *Sambucus*. S. 31548.

†*Hyphonectria aureo-nitens* (Tul.) Petch on *Stereum*. H. 32229.

Nectria coccinea (Pers.) Fr. on *Ilex*. S.

†*Ophionectria cerea* (Berk. & Curt.) Ellis & Everh. (stat. con. *Helicosporium vegetum* Nees) on *Fagus* bark and cupules. S. 32009 and 31600.

PYRENOMYCETALES—SPHAERIALES

Bertia moriformis (Tode) de Not. on *Sambucus*. S. 32014.

**Chaetomium elatum* Kunze on *Spiraea*. M. H727.

†*Chaetosphaeria innumera* (B. & Br.) Tul. on *Fagus*. S. 32234.

C. phaeostroma (D. & M.) Fckl. on *Acer*. H. 31415a.

†*Diaporthe strumella* (Fr.) Fckl. on *Ribes nigrum*. S.

Diatrype stigma (Hoffm.) de Not. on *Fagus*. S. H739.

Diatrypella favacea (Fr.) Ces. & de Not. (=*verruciformis*) on *Alnus*. H. H740; on *Betula*. H. H693; on *Fagus*. S. H722.

D. quercina (Pers.) Cke. on *Quercus*. S.

†*Helminthospheria clavariarum* (Desm.) Fckl. (stat. con.=*Helminthosporium*) on *Clavaria*. H. 32231.

Hypoxylon fuscum (Pers.) Fr. on *Corylus*. H.

H. multiforme (Fr.) Fr. on *Alnus*. H. H708.

**H. rubiginosum* (Pers.) Fr. on *Fraxinus*. H. 31456.

**H. serpens* (Pers.) Fr. on *Acer*. S. H731.

Leptosphaeria hirsuta (Fr.) Ces. & de Not. on *Acer*. S. 31415d; on *Alnus*. H. 31429c; on *Fagus*. S. 31467; on *Fraxinus*. S. H724.

L. ovina (Pers.) Ces. & de Not. J.H. 31998.

PYRENOMYCETALES—SPHAERIALES—*continued*

Leptosphaeria spermoides (Hoffm.) Ces. & de Not. on *Alnus*. H. H725.
†*L. strigosa* (A. & S.) Sacc. on *Acer*. S. 31415c.
Melanconis stilbostoma (Fr.) Tul. on *Betula*. H. H694.
Melanomma pulvis-pyrius (Pers.) Fckl. on *Alnus*. H. 31472.
†*M. subdispersum* (Karst.) Berl. & Vogl. (con.=*Helminthosporium longipilum*) on *Betula*. H. H714.
†*Nummularia lutea* (A. & S.) Nits. on *Buxus*. S. 31424.
Rosellinia aquila (Fr.) de Not. on *Acer*. S. 31999.
Spilosticta (*Venturia*) *rumicis* (Desm.) Syd. on *Rumex obtusifolius*. M. 31602a.
Xylaria hypoxylon (Linn.) Grev. S.J.H. 32004.
X. polymorpha (Pers.) Grev. on *Acer*. S. H728.

BASIDIOMYCETES

Amanita phalloides (Vaill.) Fr. H.
A. muscaria (Linn.) Fr. S.
A. pantherina (DC.) Fr. S.
A. excelsa Fr. (=*spissa* Fr.). S.
A. rubescens (Pers.) Fr. H.S.
Amanitopsis vaginata (Bull.) Roze. S.
A. inaurata (Secr.) Boud. (=*strangulata* (Fr.) Roze). S.
†*Lepiota illinita* Fr. S.
L. procera (Scop.) Fr. H.
L. acutesquamosa (Weinn.) Fr. H.S.
L. amianthina (Scop.) Fr. H.S.
L. carcharias (Pers.) Fr. S.
L. cristata (A. & S.) Fr. S.
Armillaria mellea (Vahl.) Fr. H.S.
**Tricholoma cinerascens* (Bull.) Fr. H.
**T. ustale* Fr. H.S.
†*T. pessundatum* Fr. S.
T. rutilans (Schaeff.) Fr. H.S.
T. orirubens Quél. S.
**T. virgatum* Fr. H.S.
T. cuneifolium Fr. S.
T. melaleucum (Pers.) Fr. H.S.
T. grammopodium (Bull.) Fr. H.
T. sordidum Fr. H.S.
**Clitocybe flaccida* (Sow.) Fr. S.
**C. nebularis* (Batsch) Fr. S.
C. ditopus Fr. H.
C. fragrans (Sow.) Fr. S.
Laccaria laccata (Scop.) Cke. S.
**Mycena pelianthina* Fr. S.
M. galopus (Pers.) Fr. H.S.
M. galopus var. *nigra* Fl. Dan. H.
M. sanguinolenta (A. & S.) Fr. S.
M. haematopus (Pers.) Fr. H.
M. pura (Pers.) Fr. H.
M. acicula (Schaeff,) Fr. S.
M. alcalina Fr. S.
M. aetites Fr. H.
M. galericulata (Scop.) Fr. H.S.
**M. inclinata* Fr. H.
M. metata Fr. H.S.
M. filopes (Bull.) Fr. non Kühner. H.S.
Collybia radicata (Rehl) Berk. S.
**C. cirrata* (Schum.) Fr. S.
C. tuberosa (Bull.) Fr. H.S.
C. platyphylla (Pers.) Fr. H.
Collybia butyracea (Bull.) Fr. S.
Marasmius peronatus (Bolt.) Fr. H.
M. acervatus (Fr.) Pears. & Den. S.
M. ceratopus (Pers.) Quél. S.
Marasmius confluens (Pers.) Karst. S.
M. oreades (Bolt.) Fr. S.
M. ramealis (Bull.) Fr. J.
M. rotula (Scop.) Fr. H.
M. androsaceus (Linn.) Fr. J.
†*Omphalia wynniae* (B. & Br.) Quél. S.
O. fibula (Bull.) Fr. S.
O. fibula var. *Swartzii* Fr. H.S.
Pleurotus ostreatus (Jacq.) Fr. H.
P. palmatus (Bull.) Fr. J.
Panus stipticus Karst. H.
Hygrophorus pratensis (Pers.) Fr. H.S.
H. virgineus (Wulf.) Fr. H.S.
**H. russo-coriaceus* Berk. & Miller. H.
†*H. subradiatus* (Schum.) Fr. S.
H. conicus Fr. H.
**H. nigrescens* Quél. S.
H. obrusseus Fr. H.
H. calyptraeformis Berk. H.S.
H. coccineus (Schaeff.) Bat. H.S.
H. puniceus Fr. H.
H. miniatus Fr. H.
H. psittacinus (Schaeff.) Fr. H.S.
H. ceraceus (Wulf.) Fr. H.
H. laetus (Pers.) Fr. H.S.
H. unguinosus Fr. H.S.
Lactarius plumbeus Fr. (=*turpis* Fr.). H.
L. deliciosus (Linn.) Fr. S.
L. blennius Fr. H.S.
L. pallidus (Pers.) Fr. S.
L. fuliginosus Fr. H.
L. quietus Fr. H.S.
L. glycyosmus Fr. H.
L. rufus (Scop.) Fr. H.
L. subdulcis (Pers.) Fr. S.
†*L. hepaticus* Plow. S.
Russula nigricans Fr. H.
**R. delica* Fr. S.
R. lepida Fr. H.S.
R. cyanoxantha (Schaeff.) Fr. H.S.
R. vesca Fr. S.
†*R. farinipes* Romell. S.

BASIDIOMYCETES—*continued*

Russula foetens (Pers.) Fr. H.
†*R. lauro-cerasi* Melz. S.
R. emetica (Schaeff.) Fr. S.
R. fragilis Fr. H.S.
R. fellea Fr. S.
R. atropurpurea Kromb.
R. ochroleuca Fr. H.S.
R. grisea (Pers. ex Secr.) Fr. S.
**R. xerampelina* Fr. S.
R. xerampelina var. *fusca* (Quél.) Melz. & Zv. S.
†*R. romellii* Maire. S.
**R. lutea* Fr. H.
R. venosa Vel. H.
Craterellus cornucopioides (Linn.) Fr. H.
Pluteus cervinus (Schaeff.) Fr. S.
P. nanus (Pers.) Fr. H.
P. chrysophaeus (Schaeff.) Fr. S.
Clitopilus prunulus (Scop.) Fr. H.S.
Entoloma porphyrophaeum Fr. S.
E. rhodopolium Fr. H.S.
**E. nidorosum* Fr. H.S.
Leptonia lampropus Fr. H.
Pholiota spectabilis Fr. S.
P. flammans Fr. H.
P. mutabilis (Schaeff.) Fr. H.
P. marginata (Batsch) Fr. H.
Hebeloma crustuliniforme (Bull.) Fr. S.
Flammula sapinea Fr. H.
Naucoria escharoides Fr. H.S.
Tubaria furfuracea (Pers.) Gillet. S.
Galera mycenopsis Fr. sensu Ricken. H.S.
G. hypnorum (Batsch) Fr. H.
Crepidotus mollis (Schaeff.) Fr. S.
Cortinarius elatior Fr. H.S.
C. anomalus Fr. S.
†*C. biformis* Fr. S.
†*C. flexipes* Fr. S.
†*C. imbutus* Fr. S.
**C. decipiens* (Pers.) Fr. S.
Inocybe rhodiola Bres. S.
I. pyriodora (Pers.) Fr. S.
I. geophylla (Sow.) Fr. var. *lilacina* Fr. S.
I. asterospora Quél. S.
**I. napipes* Lange. S.
Stropharia aeruginosa (Curtis) Fr. H.S.
S. semi-globata (Batsch) Fr. H.S.
Hypholoma fasciculare (Huds.) Fr. S.
H. radicosum Lange. H.
H. hydrophilum (Bull.) Fr. S.
H. pyrotrichum (Holmsk.) Fr. S.
Psilocybe elongata Fr.
Psathyrella gossypina (Bull. ex Fr.) Pears. & Den. S.
P. spadicea-grisea (Schaeff. ex Fr.) A. H. Smith. S.
P. atomata Fr. S.
Panaeolus papilionaceus (Bull.) Fr. S.
P. campanulatus (Linn.) Fr. H.S.
P. campanulatus var. *sphinctrinus* (Fr.) Bres. H.S.
Psalliota arvensis (Schaeff.) Fr. Q.
Coprinus comatus (Fl. Dan.) Fr. H.
C. niveus (Pers.) Fr. S.
C. micaceus (Bull.) Fr. H.S.
Gomphidius rutilus (Schaeff.) Fr. (=*viscidus*). S.
Boletus edulis (Bull.) Fr. S.
B. erythropus Fr. non Pers. S.
B. luteus (L.) Fr. S.
B. elegans (Schum.) Fr. S.
B. chrysenteron (Bull.) Fr. H.S.
B. subtomentosus (Schaeff.) Fr. H.S.
Polyporus adiposus B. & Br. S.
P. caesius (Schrad.) Fr. H.
P. giganteus (Pers.) Fr. S.
P. squamosus (Huds.) Fr. S.
P. sulphureus (Bull.) Fr. H.
P. varius Fr. S.
Fomes annosus Fr. H.
F. ferruginosa (Schrad.) Mass. H.S.
Poria candidissima (Schw.) Sacc. (=*Hymenocystis* B. & Br.). S.
P. sanguinolenta (A. & S.) Fr. on *Alnus*. H.
Irpex obliquus (Schrad.) Fr. H.S.
†*Trametes rubescens* (A. & S.) Fr. M.
Daedalea quercina (Linn.) Fr. H.
**Merulius rufus* Pers. on Oak. M.
Phlebia merismoides Fr. S.
Coniophora puteana (Schum.) Karst. H.
C. arida Fr. H.
Hydnum repandum (Linn.) Fr. S.
**Acia stenodon* (Pers.) B. & G. Q.
Grandinia farinacea (Pers.) B. & G. Q.
G. brinkmannii (Bres.) B. & G. H.
†*Radulum mucidum* (Pers.) B. & G. Q.
Mycoleptodon fimbriatum (Pers.) B. & G. J.
Ptychogaster albus Cda. on rotten wood. H. 31421.
Stereum gausapatum Fr. (=*spadiceum*) H.S.
†*S. chailletii* (Pers.) Fr. on Cedar. S.
Hymenochaete rubiginosa (Dicks.) Lev. H.
†*Tomentella* (*Hypochnus*) *zygodesmoides* (Ellis) v. Hohn. & L. S.
**Corticeum albo-stramineum* (Bres.) Wakefield. S.
‡*C. byssinellum* Boud. overrunning mosses. H.
C. caeruleum (Schrad. ex Pers.) Fr. H.
C. comedens (Nees) Fr. on *Alnus*. H.

BASIDIOMYCETES—*continued*

**Corticeum confine* B. & G. on *Quercus*. H. ; on *Fagus* and *Sambucus*, S.
C. lactescens Berk. S.
C. laeve Pers. H.
**C. microsporium* (Karst.) B. & G. S.
**C. praetermissum* (Karst.) Bres. S.
**C. roseo-cremeum* Bres. S.
**C. roseum* (Pers.) Fr. on *Arctium*. S.
C. sambuci (Pers.) Fr. H.
C. sulphureum (Pers. ex Fr.)Fr. on Conifer. H. (M. & G. sub *Hypochnus fumosus*).
Pellicularia subcoronatum (v. H. & L.) Rogers. S. ; on *Alnus*. H.
P. vaga (B. & G.) Rogers on *Larix*. Q. ; on Douglas Fir. H. (M. & G. both sub *Corticeum*).
P. pruinata (Bres.) Rogers on *Quercus*. H. 32539.
Peniophora cinerea (Fr.) Cke. on *Fraxinus*. H.
**P. cremea* (Bres.) Sacc. & Syd. H.
**P. glebulosa* (Bres.) Sacc. & Syd. S.
P. hydnoides Cke. & Mass. S.
**P. pallidula* Bres. on Spruce. Q.
**P. pubera* (Fr.) Sacc. S. ; on *Quercus*. H. ; on *Alnus*. Q.
Peniophora quercina (Pers.) Cke. H.
†*P. roumeguerii* (Bres.) v. H. & L. on *Fagus*. Q. (=*P. molleriana* (Bres.) Sacc.).
†*Saccoblastia sebacea* B. & G. M.
†*Tulasnella violea* (Quel.) B. & G. on *Alnus*. Q.
Clavaria corniculata (Schaeff.) Fr. H.
C. fumosa (Pers.) Fr. H.S.
C. inaequalis (Mull.) Quel. S.
C. pulchra.
C. rugosa (Bull.) Fr. H.
**C. luteo-alba* Rea. H.
C. vermicularis Fr. H.S.
Auricularia auricula-judae (Linn.) Schroet. on *Euonymus*. H.
Calocera cornea (Batsch) Fr. H.
Cynophallus caninus (Huds.) Fr. H.
Phallus impudicus (Linn.) Pers. H.
Lycoperdon echinatum Pers. H.
L. perlatum Pers. H.S.
L. pyriforme (Schaeff.) Pers. H.S.
Bovista plumbea Fr. S.
Scleroderma verrucosum (Vaill.) Pers. S.

UREDINALES

Coleosporium petasitis Lev., II, III. M.H.
C. senecionis (Pers.) Fr., II, on *S. vulgaris*. M.S.
C. sonchi Lev., II, III, on *S. arvensis*. M.
C. tussilaginis Tul. M.S.H.
Kuehneola albida (Kuhn) Magn., II, III. S.
Melampsoridium betulinum (Pers.) Kleb., II. H.
Pucciniastrum agrimoniae (Schw.) Tranz., II. M.
P. circaeae (Schum.) Speg., II. M.
**P. pustulatum* Diet., II, III. H.
Phragmidium violaceum Wint., II, III. J.
**Puccinia acetosae* (Schum.) Koern., II. M. H745.
**P. annularis* Schlect., III. H.
P. behenis Otth., II. J.
P. caricis (Schum.) Reb., II, III on *C. pendula*. H. ; on *Carex* sp. M.
P. centaurea DC., II, III. M.
P. chaerophyllae Purt., III on *Myrrhis*. M.
†*P. cirsii-lanceolata* Schroet., II, III on *C. lanceolata*. S.
P. expansa Link., III, on *Senecio aquaticus*. M.
P. glumarum Er. & Henn., II, III, on *Agropyron*. M. ; II, on *Dactylis*. M.
P. lapsanae Fckl., II, III. H.
P. lolii Niels., II, III, on *Arrhenatherum* and *Holcus*. M.
P. lychnidearum Link., III. S.
P. major Diet., II, III. S.
P. menthae Pers., II, III on *M. aquatica*. M.
†*P. mirabillissima* Peck., II, III on *Mahonia aquifolia*. S.
P. obtegens Tul., II, III. M.
P. poarum Niels., OI. on *Tussilago*. M.
P. saniculae Grev., II, III. S.
Uromyces dactylidis Otth., II, III. M.
U. rumicis (Schum.) Wint., II, III. M. H723.
U. valeriana (Schum.) Fckl., II, III, on *V. dioica*. M.

USTILAGINALES

Urocystis anemones (Pers.) Wint. on *Ranunculus repens*. M.

HYPHOMYCETES

**Acremoniella atra* (Cda.) Sacc. on leaves of *Rumex obtusifolius*. M. 31602c.
**Arthrobotryum atrum* B. & Br. on *Spiraea*. M. 32232 ; on *Fagus* cupules. S. 31600a.
†*Bactrodesmium caulincola* var. *pellucidum* Grove on *Aesculus* fruits. S. 31452c ; on *Fagus* cupules. S. 31600i.
Bactridium flavum Kunze. on *Fraxinus*. H. H730.
Botryosporium pulchrum Cda. on *Urtica*. S. 32016.
†*Brachysporium bloxami* (Cke.) Sacc. on *Acer*. S. 31996 ; on *Prunus avium*. S. 31410b ; on *Quercus*. H. 31995.
**B. tingens* (Cke.) Sacc. on *Ilex*. S. 31431b.
†*Calcarisporium arbuscula* Preuss. on *Lactarius* sp. H. 31480.
†*Catenularia cuneiformis* (Richon) Mason on *Fraxinus*. S. 31417.
Cladosporium herbarum (Pers.) Link. on *Urtica*. M. H692.
†*Clasterosporium fasciculare* (Cda.) Sacc. on *Alnus* stump. H. 31429b.
†*Constantinella cristata* Matr. on soil. S. 31457 ; on plant debris. S. 31451 ; on *Fagus* twigs. S. 31458.
†*Cylindrodendrum album* Bon. on *Aesculus* fruits. S. 31452c.
†*Dendryphium laxum* B. & Br. on *Brassica*. H. H705.
†*Diplococcium spicatum* Grove on *Betula*. H. 32005.
**Epicoccum purpurascens* Ehrenb. on *Urtica*. M. H691.
**Fusidium viride* Grove on *Heracleum*. M. 31408b ; on *Petasites*. M. 31455a ; on *Urtica*. M. 31407a.
†*Graphium grovei* Sacc. on *Prunus laurocerasus*. S. 32001.
Haplaria grisea Link on *Fagus*. S. 32018.
**Haplographium bicolor* Grove on *Fagus*. S. 31414b.
**H. delicatum* B. & Br. on *Fagus*. S. H707.
†*Helicomyces roseus* Link on *Ilex*. S. 31431a.
**Menispora ciliata* (Link) Linder on *Fagus*. S. 31466 ; on *Ilex*. S. 31419 ; on *Prunus avium*. S. 32006.
**Oidium* (*Monilia*) *aurea* Link on *Fagus*. S. 31425.
**O. conspersum* (Link) Linder on Spruce. Q. 31459 ; on *Betula*. H. 31543.
Ovularia obliqua (Cke.) Oud. on *Rumex obtusifolius*. M. 31602d.
†*Papularia arundinis* (Cda.) Fr. on *Bambusa*. S. H716.
†*P. sphaerosperma* (Pers.) v. Hohn. on *Bambusa*. S. H717.
†*Pachybasium candidum* (Sacc.) Peyr. on *Rubus*. S. 31546.
**P. tilletii* (Desm.) Oud. on wood. S. 31428.
†*Septocylindrium pallidum* Grove on *Diatrype* on *Acer*. S. 31415b ; on *Diatrype* on *Fraxinus*. H. 31412b.
†*Speira toruloides* Cda. on *Fagus* cupules. S. 31600e ; on wood. S. 32017.
†*Sporocybe flexuosa* (Mass.) Mason on *Fagus*. S. H686b ; on *Prunus avium*. S. H699b.
†*S. grandis* Link on *Amanita rubescens*. S. 33864.
†*Sporoschisma juvenile* Boud. on *Alnus*. H. 31429a.
†*Stachylidium bicolor* Link on *Heracleum*. M. 31408a ; on *Urtica*. M. 31407b.
**S. cyclosporum* Grove on *Fagus*. S. 31426 ; on *Quercus*. H. 32003.
†*Torula gyrosa* Cke. & Mass. on Conifer. H. 31409a.
T. herbarum Link on *Aesculus* fruits. S. 31452e ; on *Polygonum persicaria*. M. 31470 ; on *Urtica*. M. H690.
†*T. hysterioides* Cda. on *Fraxinus*. S. 31464 ; on *Ilex*. S. 31431c.
Trichothecium roseum Link on *Acer*. S. ; on *Spiraea*. M. 31430.
**Triposporium elegans* Cda. on *Fagus* cupules. S. 31600i ; on *Ilex*. S. 31431d ; on *Quercus*. S. 31453d.
†*Verticladium apicale* B. & Br. on *Pinus sylvestris* needles. S. 31601c.
†*V. trifidum* Preuss. on *Pinus sylvestris*. S. 31601a.

Welsh Ferns : A Descriptive Handbook, by **H. A. Hyde** and **A. E. Wade.** Second edition. Pp. x+131 with 10 plates and 67 figures. National Museum of Wales, Cardiff. 5/-.

Only a few minor changes have been made in the new edition of this excellent handbook. Anyone interested in these plants who did not procure a copy of the first edition should get one now as the inclusion of all British species and not merely those occurring in Wales makes this a most useful fern flora.

Y.N.U. BRYOLOGISTS AT AUSTWICK

On Saturday, September 18th, a small party of the Bryology Section was favoured by fine weather for a visit to Norber. An excursion to include Wharfe Wood had been arranged for the Sunday, and despite a continued drizzle of rain this was adhered to. An advantage to many members, due to Mr. C. A. Cheetham's knowledge of the flora of the district, was that the bulk of the plants could be named in the field and any characteristic habit of growth or situation could be noted. The following list gives some indication of the types of mosses met with, but the area covered would yield many more had time permitted a more extended search.

Mosses (G. A. Shaw) : The first day was spent on Norber and in Crummockdale. On the limestone boulders of Norber Syke we had the opportunity of observing two species of *Trichostomum* growing side by side : one, *T. tortuosum* Dixon, with its long leaves, and the other, with much shorter leaves, variously referred to *T. nitidum* Schp. and *T. tortuosum* Dixon var. *fragilifolium* (Juratz.). We did not find the nerve of the latter plant glossy and shining at the back as should be the case with *T. nitidum*. An informative account of the moss flora of boulders in this area is given by C. A. Cheetham in *The Naturalist*, 1939, 153. About here were also seen *Ditrichum flexicaule* Hampe var. *densum* B. & S., *Seligeria recurvata* B. & S., *Grimmia apocarpa* Hedw. var. *gracilis* W. & M., *Rhacomitrium protensum* Braun., *Pottia truncatula* Lindb., *Barbula lurida* Lindb., *Camptothecium lutescens* B. & S., and a robust form of *Amblystegium filicinum* De Not. A small quantity of *Cylindrothecium concinnum* Schp. was seen on a limestone scree, and higher up, in a similar situation, an abundance of *Hylocomium rugosum* De Not. An interesting hour was spent on the flat rocks of Barker Crags, where *Andreaea petrophila* Ehrh. and *A. Rothii* W. & M. were growing together, and here Mrs. Appleyard found *Rhabdoweisia denticulata* B. & S., and she made another good find in *Ephemerum serratum* Hampe on some more flat rocks a little further up the valley, a moss which is new to this area. From Norber, Mr. Cheetham took us down to the falls, looking at *Hedwigia ciliata* Ehrh. on the way, when he gave us his views on *Grimmia Hartmani* Schp., which occurs here. None of us was able to find the gemmae which usually occur on the tips of the upper leaves in this moss. Other mosses seen during the day included *Polytrichum urnigerum* L., *Cynodontium Bruntoni* B. & S., *Rhacomitrium heterostichum* Brid., *Zygodon Mougeotii* B. & S., and *Breutelia arcuata* B. & S.

The second day was spent on Oxenber. In the lane on the way there *Eurhynchium piliferum* B. & S. was plentiful. One of the old quarries yielded good *Thuidium Philiberti* Limpr., with long filiform apiculi to the stem leaves. *T. delicatulum* Mitt. was seen in Wharfe Wood. *Hylocomium brevirostre* B. & S. and *Eurhynchium striatum* B. & S., which somewhat resemble one another in the field, were observed growing together, and after a little practice we were able to distinguish them with ease. Other mosses of interest seen on this day included *Fissidens decipiens* De Not., *Ulota Bruchii* Hornsch., *Trichostomum mutabile* Bruch. var. *cophocarpum* Schp., *Orthothecium intricatum* B. & S., and *Hylocomium rugosum* De Not.

Mrs. J. Appleyard adds to this list *Pottia minutula* Fuernr., a small moss as the name implies, but made noticeable by its many capsules. Although found in cultivated fields it is not confined to these situations. These plants were found on the floor of a disused limestone quarry and the species does not appear in prevous Austwick records. *Ephemerum serratum* Hampe, referred to above, has only one other V.C. 64 record.

Rhabdoweisia denticulata B. & S., a moss which members were interested to see, was recorded by Mr. C. A. Cheetham in the Ingleborough and Wharfe area about 1911, and W. Ingham recorded it for Moughton. The only other V.C. 64 record is for Stainforth, and a few places for V.C. 65 are on record, mainly about Cautley. The record for V.C. 63 in Mosses of Yorks. (*Trans. Y.N.U.* (1945)) should be deleted, as this refers to records made by J. Nowell, all for Green's Clough from 1840 to 1854. This clough is about half a mile on the Lancashire side of the county boundary. Reference to this record is made in the *Flora of Halifax* (1904) and the *Flora of Todmorden* (1911) by Abm. Stansfield and J. Nowell.

It was hoped to find *Cynodontium Bruntoni* B. & S. in fruit, but the plants seen were barren. This is often the case, but Mr. Cheetham commented upon seeing

plants with capsules between Austwick and Crummock Farm. The wet summer had evidently favoured the growth of what is usually an inconspicuous moss, *Archidium alternifolium* Schp., for it was seen in quantity, though disappointingly without its characteristic capsules. An addition to the above list, *Webera annotina* Schwaeg. var. *erecta* Correns, was found on the damp margins of a grassy lane and in such situations it is probably more common than the records suggest. This is an addition to V.C. 64.

Hepatics (H. Walsh) : One of the highlights was the quantity of *Riccia Beyrichiana* Hampe in the area investigated, particularly on the floor of an old limestone quarry. The first Yorkshire record in 1923 was for this district and later from Ingleborough. Another well-distributed thalloid in the area, both in the open and in woodland, *Pellia Fabbroniana* Raddi, was seen displaying its autumn method of branching. This species seems unable to tolerate acidity and in the Millstone Grit and Coal Measures of S.W. Yorkshire is replaced by *P. epiphylla* (L.) Corda, and the presence of the former plant becomes a reliable indicator of neutral or alkaline conditions. In the exposed area of Barker Crags, Norber, where *Andreaea petrophila* and *A. Rothii* were examined, an hepatic attracted attention by the red appearance of the colonies due to the colour of the numerous gemmae on the leaves. A *Lophozia*, yes, but which? Few *Lophozias* bear gemmae of this colour. Possibly a form of *L. Floerkii* (W. & M.) Schiffn., but this species has the character of rarely producing gemmae. This query had been pursued by the late Mr. F. E. Milsom, when plants were found similar to these from Norber, which agree with the description of *L. atlantica* (Kaal.) Schiffn., placed between *L. Floerkii* (W. & M.) Schiffn. and *L. attenuata* (Mart.) Dum. *L. atlantica* has been recorded from about fifteen vice-counties from Merioneth to Caithness. In 1907 it was recorded from Hardcastle Crags, V.C. 63, by W. Ingham and again in 1918 by W. H. Pearson. *L. Floerkii* and *L. attenuata* are both plentiful in the Crags. It was recorded in 1929 for Burley Moor and Lindley Reservoir by Mr. W. H. Burrell, both in V.C. 64. From 1931 to 1941 opinions were expressed that most or perhaps all the plants which have been named *L. atlantica* in this country are gemmiferous forms of *L. Floerkii*. In 1947 the writer found in an exposed position in one of the cloughs a few miles to the west of Hardcastle Crags, Jumble Hole or Staups Clough, an extensive patch of a *Lophozia* with conspicuous red gemmae and in general appearance similar to the Norber plants. Examination placed the plants as *L. atlantica*, but as this species was a difficult one they were placed on one side for further study. The finding of the plant again at Austwick and the comparison of the two reopened the question of their identity and both gatherings were submitted to Dr. E. W. Jones, who states, ' I think that your two plants would probably come under *L. atlantica* as defined by MacVicar.' The matter cannot be said to be very satisfactory, but as Dr. Jones has placed *atlantica* on the packets they will be provisionally recorded as such.

Riccia Beyrichiana Hampe.
R. sorocarpa Bisch.
Preissia quadrata (Scop.) Nees.
**Aneura multifida* (L.) Dum.
**A. pinguis* (L.) Dum.
Pellia Fabbroniana Raddi.
**Alicularia scalaris* (Schrad.) Corda.
**Aplozia crenulata* (Sm.) Dum. var. *gracillima* (Sm.) Heeg.
A. riparia (Tayl.) Dum. var. *rivularis* Bern.
**Lophozia ventricosa* (Dicks.) Dum.
L. quinquedentata (Huds.) Cogn.
L. Floerkii (Web. & Mohr.) Schiffn.
†**L. atlantica* (Kaal.) Schiffn.
Plagiochila asplenioides (L.) Dum.
* and var. *major* Nees (Wharfe Wood).
Leptoscyphus Taylori (Hook.) Mitt.
Lophocolea bidentata (L.) Dum.
**Cephalozia bicuspidata* (L.) Dum.
**C. connivens* (Dicks.) Lindb.
**C. media* Lindb.
††‡*Cephaloziella Hampeana* (Nees) Schiffn.
Odontoschisma sphagni (Dicks.) Dum.
Calypogeia trichomanis (L.) Corda.
Bazzania trilobata (L.) Gray.
Lepidozia reptans (L.) Dum.
**Ptilidium ciliare* (L.) Hampe.
Diplophyllum albicans (L.) Dum.
†*Scapania aspera* Bernet.
**S. nemorosa* (L.) Dum. (Wharfe Wood).
Madotheca platyphylla (L.) Dum.
Frullania Tamarisci (L.) Dum.

* New to Austwick. † Cert. Dr. E. W. Jones. ‡ New to V.C. 64.

BOOK REVIEWS

The Badger, by **Ernest Neal.** Pp. xvi+158, with one colour and 29 monochrome photographs and 12 maps and diagrams. New Naturalist Monograph, No. 1. Collins, 12/6.

The badger is an unobtrusive creature. Despite its widespread and, over large areas, common occurrence throughout the British Isles, its shyness and nocturnal habits combine to make it unfamiliar to most countrymen and completely unknown to almost all townspeople. There are many points about its behaviour and especially about the reproductive cycle, on which conflicting views have long been expressed and on these and other matters information based on animals kept in captivity is not necessarily applicable to those living under natural conditions. Mr. Neal set out to discover all he could about badgers by watching them at all times of the year in their natural surroundings. He has almost certainly devoted to his study more hours of patient watching than any previous observer. The results obtained are highly interesting both as to the information acquired, its attractive manner of presentation and the excellent photographic illustrations. He has had the satisfaction of solving the problem of the time of mating which he shows to take place in July and August to be followed normally by a gestation period of seven months. But there is hardly an aspect of the behaviour, family life or feeding habits of these splendid animals on which his inexhaustible patience and perseverence have not yielded valuable information.

Mr. Neal's book is natural history at its best. What he has to say about badgers will long be quoted, not as the last word to be said about them for there is still ample room for further study, but certainly as the most thorough and critical study of their biology which has so far been undertaken. It is to be hoped that the knowledge will spread beyond the ranks of naturalists and do something to mitigate the stupid persecution which is still practised upon an animal the activities of which are wholly beneficial to man.

The high standard set in this first volume of New Naturalist Monographs dealing with detailed studies of single species augurs well for the future of a series which is likely to be of first-rate interest and value to field naturalists.

W. A. S.

Birds in Camera, by **Walter E. Higham.** Pp. 125 with 83 plates. Collins, 15/-.

This book is divided into three parts: (1) Birds of My Neighbourhood (Lancashire and Yorkshire boundaries); (2) Birds of the Sea and Seashore (Scilly, Lancashire coast, Bass Rock); (3) The Broadland District (Norfolk). It is essentially a picture-book, containing outstanding examples, beautifully reproduced, of the work of a leading bird photographer, whose superb technique we have often admired. The Montagu's Harrier is featured serially, in 14 plates of unsurpassable beauty, showing both sexes in flight, alighting, and on the ground. The 45 other species depicted, with perhaps one exception, are worthy of inclusion in such a magnificent collection,

The letterpress is clear and concise, and forms a written commentary on the birds illustrated, their incidental behaviour and the author's methods. Many an interesting event in the field is recorded. Perhaps it should have been made more clear that the legs by which young Woodcocks are held when carried are those of the parent, not of the young! The author's preference for by-passing inadequately illuminated nesting-sites, and for photographing the avian owners on an adjacent perch, rather than to lay bare the nest, is endorsed by the reviewer, and is one of the secrets of success in this pursuit.

R.C.

The Art of Bird Photography, by **Eric Hosking** and **Cyril Newberry.** Pp. 100, with 77 photographs on 56 monochrome and 6 colour plates. Country Life, 12/6.

This book is a reprint from the edition of 1944, and has been revised and enlarged. Without any doubt the authors have applied photographic technique to wild birds most thoroughly and successfully. The methods and equipment that have been so successful are described fully and frankly. An up-to-date chapter on flashlight work is included, cinematography touched upon, and it is assumed that bird students will be interested in the photography of 'Trees, Flowers and Insects.' Chapters entitled 'Nature in Colour' and 'Dark-room Notes' complete

a book that is full of useful informaion. To ensure equal success with the authors, the methods and equipment used will need to be combined with equal ability, perseverance and determination.

R.C.

The Lapwing, by **E. A. R. Ennion.** Pp. xii 47, with 4 colour plates and 32 black and white drawings. Field Study Books, No. 1, 6/-.

British Bats, by **Brian Vesey-Fitzgerald.** Pp. 61 with 4 colour plates and 28 black and white drawings. Field Study Books, No. 2. General Editor, E. A. R. Ennion. Methuen & Co., Ltd., London, 6/-.

These are the first two volumes to be published in this new series which is intended to deal with ' everything . . . whose natural setting is the open air.' Both are illustrated by the general editor, Dr. Ennion, in a pleasing manner, and the only criticism which is offered is that Plate I of *The Lapwing* is not clearly reproduced. The black and white drawings are very helpful and altogether the books are well produced.

In *The Lapwing* Dr. Ennion tells an observer's story, month by month, of the Lapwing's year, illustrated by the breeding cycle of an individual pair. Into this story he introduces numerous problems confronting the ornithologist and how they are approached. It is a study of the Lapwing, but it is also an insight, and a lure, into much wider ornithological fields. A short but well-chosen bibliography is given.

Mr. Vesey-Fitzgerald has given us the first British book devoted solely to bats. Each British species has its own chapter with sub-headings on appearance, teeth, young, hibernation, habits, food and flight and the author has not hesitated where necessary to put in the tantalising phrase ' No British information.' Then follow some short chapters on general features which include inevitably the fascinating problem of flight control. To this chapter a number of references to the literature are given. In this excellent little book the author makes it quite plain that there is ample scope for confirmation or refutation of what has been said about bats.

J.H.E.

Gall Midges of Economic Importance, IV, Ornamental Plants and Shrubs, by **H. F. Barnes.** Pp. 165 with 10 plates. Crosby Lockwood & Son, Ltd., 15/-.

The welcome, though long overdue, fourth volume of Dr. Barnes' great work is now to hand. It follows very closely the admirable plan of the previous volumes which have been reviewed in *The Naturalist*. Mr. G. Fox Wilson contributes the Foreword which is followed by the Preface (dated February, 1946 !) wherein, incidently, the author invites criticism of the selection of host-plants included. The book deals with the gall midges of ornamental plants and shrubs, and as the author points out, the choice of such plants varies widely in different countries so that some omissions are inevitable. A glance at the list of contents on page 13 shows that Dr. Barnes has grouped the midges under 44 generic or equivalent plant headings and his choice will be approved generally by the English reader since nearly all the groups embrace plants widely grown in our gardens and greenhouses. It is probable that North American and European readers will find the choice nearly as satisfactory. In considering these groups of plants Dr. Barnes' approach is global and about 150 different gall midges are dealt with ; we looked in vain, however, for reference to several well known groups of garden plants, the gall midges of which, doubtless, must be of minor importance. Particularly valuable are the monographs on the Chrysanthemum Gall Midge (p. 46-64), Rose Midges (p. 95-110) and the midges of Violets and Pansies (p. 114-127).

Control measures and practical matters are given the fullest treatment in conformity with the place the work occupies in a series of agricultural and horticultural monographs. The usual invaluable references to published literature and indices to midge names, plants and general matters are included. As in the previous volumes the present book contains a wealth of valuable data of the greatest interest to the economic entomologist, the modern horticulturalist, and to the field naturalist. We commend Dr. Barnes for sustaining our interest during the long period which has elapsed since the first volume appeared and we wish him as prompt a delivery of his fifth volume as present conditions will allow.

W.D.H.

The Caterpillars of British Moths, compiled by **W. J. Stokoe.** Series I. Pp. 408 with 702 illustrations, 251 in colour. Series II. Pp. 381 with 781 illustrations, 190 in colour, and text figures of food-plants. Warne & Co., Ltd., 15/- per volume.

These new volumes are companions to the previously issued *Caterpillars of British Butterflies*, and the larvae of the main part of the Lepidoptera described in the original works by Richard South are now fully described and figured. Mr. Stokoe has had the assistance of Dr. Stovin, who has edited the volumes and contributed special articles, one of which, in Series I, is the chapter on Mendelism as applied to Lepidoptera. This chapter gives much useful and interesting information.

The arrangement of the species is similar to that in South's works and those dealt with in Series I comprise the families SPHINGIDAE to BREPHIDAE and in Series II the families GEOMETRIDAE to HEPIALIDAE. Information on each species is arranged in the following order—distribution of species, descriptions of ova, larvae and pupae with the period of their occurrence and the more usual food-plants on which the larvae may be expected. Great care has obviously been taken to avoid the omission of details in the life-cycles, the descriptions are most lucid and accurate and the occasional hints on rearing in captivity will prove valuable to readers. Although not strictly within the scope of this series it would have been useful if the species of ichneumon which attacks the insect had been mentioned where known, as well as the inclusion of any other pests or diseases to which the larvae may be adversely subjected.

Figures and photographs of ova, larvae and pupae by A. E. Tonge and Horace Knight form a large part of the books. The coloured plates from water-colour paintings from life by J. C. Dollman, enliven the works. All the figures of caterpillars are shown as natural size and fully grown. One cannot but wish that a few sketches of younger larvae had been included, but those which are figured will prove useful in checking identifications.

Over 300 food-plants are described and illustrated by line-drawings in Series II. This inclusion is convenient and although of necessity the descriptions are brief they will save time when the volumes are in use.

This new addition certainly maintains the standard of Warne's previous works in the *Wayside and Woodland* Series and is thoroughly recommended. E.D.

Driftwood Valley, by **Theodora C. Stanwell-Fletcher.** Pp. 288, with 18 animal sketches by John F. Stanwell-Fletcher. Harrap, 15/-.

This is the story of a husband and wife who realised their joint ambition to live alone in the wildest part of British Columbia and devote their time to studying the animals and plants. The Driftwood Valley lies in country difficult of access frequented only by a few Indians and virtually untrodden by white men. Here, in a setting of enchanting beauty and peacefulness they built a log cabin and lived alone in the wilderness for nearly two years until America's entry into the war terminated their adventure. Life under such conditions is reduced to simple terms. The problem of subsistence is always in the forefront of the daily round, and though it was fairly easily solved at most times of the year as the country abounded in game, there were times in the winter when deep snow and temperatures falling to 50° below zero called for all their courage and endurance. The factors which enable a man and woman to cope successfully with such a wilderness existence are as much temperament and character as resourcefulness and craft. Without the last it would be impossible : without the first it would be unendurable.

This narrative of their adventures and misadventures inevitably brings out their relationship with one another as well as their preoccupation with the wild life of the forests and mountains which surrounded them. The animals included black and grizzly bears, wolves and moose as well as many smaller kinds while 139 species of birds were identified including the rare trumpeter swan. There are many interesting observations on animals (John Stanwell-Fletcher's drawings of which are admirable) and birds interspersed throughout this very interesting account of a strenuous and often precarious yet strangely satisfying existence. Naturalists will therefore find an added interest in a story which will also appeal to all those readers who find pleasure and relief in reading about places and things untouched by the despoiling hand of man. W. A. S.

Henry David Thoreu, by **Joseph Wood Krutch.** Pp., xiii+298. Methuen, 15/-.

Thoreau is one of the immortals of American literature. His reputation rests almost wholly on one book, for if *Walden* had never been written it is improbable that his other voluminous writings, most of which were published posthumously, would ever have secured lasting fame for him. He was a fervent nature lover in the literal sense with the courage of his conviction that organised social life was incompatible with the kind of existence which he thought most worth living. He took his stand for the simplification of life and quiet contemplation of nature and he worked out a philosophy aimed at reconciling the social and economic, ethical and religious implications of his gospel of life. For all his love of nature he could scarcely be called a naturalist. He was familiar and intimate with but not knowledgeable about living things ; aesthetically appreciative but scientifically disinterested.

This handsomely printed volume is one of the first two books to be issued in a new series dealing with American men of letters. The author is a Professor of Literature at Columbia University and his book is executed with all the thoroughness appropriate to his calling. It is a combination of biography and critical analysis which deals objectively and very readably with this naturalistic philosopher whose message casts as great a spell over his readers to-day as it did nearly a century ago.

W. A. S.

Giant Fishes, Whales and Dolphins, by the late **J. R. Norman** and **F. C. Frazer,** illustrated by **W. P. C. Tenison.** Pp. 376 with 8 coloured plates and 97 text figures. Putnam, 15/-.

The second edition of this very useful book first issued in 1937 and long out of print has been completely revised and much new material has been added. Although not a treatise it is a concise and authoritative guide to the larger fishes and whales of the world equipped with keys for the identification of species. The descriptions are clear without being burdensome or technical and much information is given on interesting and often entertaining incidents relating to the habits, feats of endurance and general biology of these marine monsters. It is good for instance to have reliable data regarding the sizes of sharks and whales but much other information about these creatures not readily accessible elsewhere has been brought together in a most readable book which has considerable permanent value as a reference work for marine naturalists as well as for all who travel on the sea.

H. H.

Adventures with Animals and Plants, by **Elsbeth Kroeber** and **Walter H. Wolff.** Pp. 600, with coloured frontispiece, 343 photographs and 180 diagrams. D. C. Heath and Company, Boston (distributed in England by G. G. Harrap & Co., Ltd.), 15/-.

In spite of its title, this book is designed to follow a biology course in American schools. Probably many readers will find the treatment unorthodox and it certainly calls for a great deal of individual thought by the student; the questions, exercises and further activities at the end of the book being somewhat formidable. The scope of the book is wide but it does not give the detail of individual types such as is required in our own syllabuses. The chapters on health and hygiene are useful, but it is doubtful whether practical work in bacteriology is of value at this stage of study. Apart from this question of approach there can be no doubt that the book should have a wide appeal to young (and perhaps not-so-young) people. The text is informative and up to date, the production is excellent and the illustrations of a high standard, some of the diagrams being much clearer than those which occasionally find their way into the more orthodox text-books.

J. H. E.

U.F.A.W. (The Universities Federation for Animal Welfare, 284 Regents Park Road, Finchley, N.3) again issues the coloured poster by Fougasse at the cost price of 3d. each. The eminent cartoonist caricatures a diminutive man sitting on a nest being inspected by a large, frowning bird. The caption reads : ' How would you like it yourself? ' and the words ' When you find a bird's nest, *don't* touch, *don't* stay long, *don't* go often.'

JULY-SEPTEMBER, 1949 No. 830

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The NATURALIST

A QUARTERLY ILLUSTRATED JOURNAL

PRINCIPALLY FOR THE NORTH OF ENGLAND

Edited by

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Contents

	PAGE
Notes on a Net-Spinning Caddis Larva, *Hydropsyche angustipennis* (Curt.)—*H. Whitehead, B.Sc.*	89-90
Material for a Study of Tree Regeneration—*H. Tordoff, M.A., B.Sc., and E. Dearing, B.Sc.*	91-97
Bryological Notes and Records	97-98
The Sea-Shore—*H. Henson, D.Sc., Ph.D., F.R.E.S.*	99-100
The Coleoptera of Askham Bog—*J. H. Fidler, M.A., Ph.D.*	101-113
Notes on Seeds and Seedlings—*W. E. L. Wattam*	114
Ornithological Report for Northumberland and Durham for 1948	115-131
Barnsley's New Municipal Museum	131
In Memoriam—Robert Procter—*W.D.H. and W.A.W.*	132
Book Reviews	132-136
Lepidoptera Committee—Appeal for Assistance	136
Plate I	

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YORKSHIRE NATURALISTS' UNION

Phenological Committee.

Will Recorders please note that the Phenological Return for the current year should be posted to the Chief Recorder, W. E. L. WATTAM, 302 Newsome Road, Huddersfield, not later than the 1st October next.

ENTOMOLOGICAL SECTION, LEPIDOPTERA COMMITTEE.

Would all members interested in Lepidoptera please submit a list of species seen or taken in their localities during the past year? Notes upon the status of even the common species would be appreciated. Any notes should be forwarded to the Recorder :—E. DEARING, 10 Bray Road, Speke, Liverpool 19.

SPURN BIRD OBSERVATORY
WARREN COTTAGE LETTINGS FOR 1949

The Committee desire to have the spring (March to late May) and the autumnal (end July to mid-November) migration periods covered completely by competent ringers. Preference will be given to Y.N.U. members as far as possible. Charges continue at the rate of 3/- per night per person. Will those willing and able to take charge for periods please agree them with the Hon. Secretary as early as convenient, giving, if possible, alternative dates and periods? This will enable those who can give time out of the holiday seasons to make their plans and to fill blanks. Visits by those who are not registered ringers, short period and week-end occupation, etc., can then be arranged for other helpers who should also apply early. Visits are often difficult to arrange at short notice. With six occupants the cottage is considered full.

G. H. AINSWORTH (144 Gillshill Road, Hull),
Hon. Secretary.

NOTICE.

Exchange copies of the following periodicals may be had on loan from The Editor of *The Naturalist*, The University, Leeds 2, on receipt of stamped addressed envelope :

The Entomologist.
The Entomologists' Monthly Magazine.
Entomologists Record and Journal of Variation.
British Birds.
Bird Notes.
Science Progress.
Essex Naturalist.
The London Naturalist.
The Scottish Naturalist.
Irish Naturalists' Journal.
Transactions of the Lincolnshire Naturalists' Union.
Transactions of the British Mycological Society.

FOR SALE

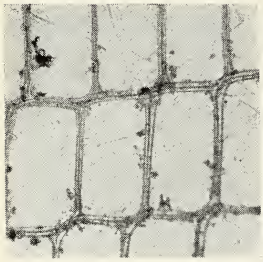
BACK NUMBERS OF THE NATURALIST

Complete sets are not available but numerous volumes from 1886-1905, and odd volumes and parts of other years, to 1932, can be supplied at 2/6 per volume or 6d. per part. Copies from 1933 can be supplied at cost price.

APPLY TO

The Editor of the Naturalist, The University, Leeds, 2

A



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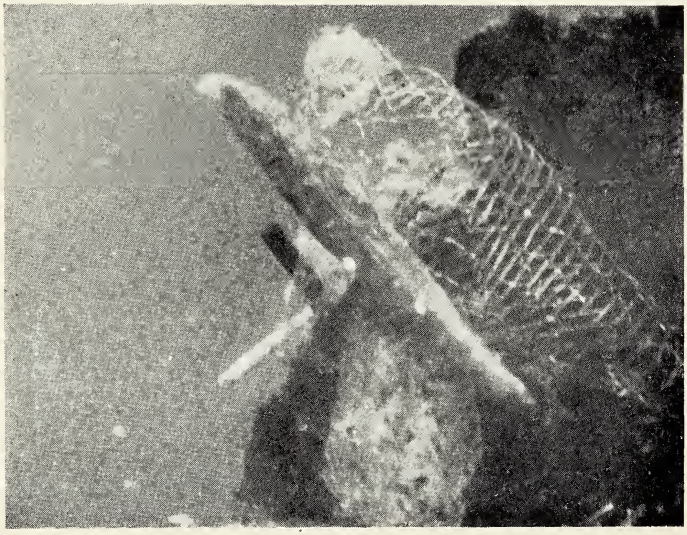

D

Photos by] [A & B *by H. Whitehead:* C & D *by A. E. Winter*

Hydropsyche angustipennis (Curt.)

A.—Larva × 1. B.—Portion of plankton net × 120. C.—Plankton net × 8. D.—Net showing captured larva × 14.

NOTES ON A NET-SPINNING CADDIS LARVA, *HYDROPSYCHE ANGUSTIPENNIS* (Curt.)

H. WHITEHEAD, B.SC.

Caddis larvae belonging to the genus *Hydropsyche* are fairly common under moss-covered stones in clear swift streams. They live a sedentary life in a silken web and do not form a case of mineral or vegetable fragments.

Most of the observations recorded in these notes were made on larvae of *Hydropsyche angustipennis* (Curt.) found in Adel Beck, a stream on the outskirts of Leeds.

To the underside of partly submerged stones with the upper side moss covered, fragmentary leaves of beech, oak or alder may be seen attached by silken threads. Under the leaf there is usually a larva of *Hydropsyche* lying in a web of fine silk which is difficult to see. This web is in the form of a tunnel with an opening at the upstream end, and at the other end, and generally at the side, an outlet over which is placed a small, beautifully formed net with rectangular meshes made of silk fibres rather thicker than those of the web. This small net bulges slightly, forming a sac containing remains of small larvae of various insects, worms and vegetable matter. The web is used as a dwelling and together with the net furnishes the larva with an efficient means of catching food. Plate I, fig. D, shows a net containing a captured dipterous larva. The web forming the tunnel (not shown) is closely and irregularly woven and offers considerable resistance to a stream of water entering it. On the other hand the net with meshes averaging 0.3×0.13 mm. (the mesh of finest miller's bolting silk is 0.25 to 0.5 mm.), allows water to pass freely but retains fragments including food, thus serving as a plankton net.

Wesenberg-Lund (1911) observed webs and nets of this species in a swift stream in North Zeeland, Denmark. The larvae had used leaves of aquatic plants, chiefly Ivy-leaved Duckweed (*Lemna trisulca* L.) held together by silk to form rows of dwellings, the openings facing upstream. He gives sketches showing the arrangement of the colony and a diagram of a single unit. The nets that I have seen have not shown such uniformity, possibly due to the fact that larger leaves have been used.

The web is formed of double fibres of silk which measure 15μ across and are irregularly laid. The plankton net (Plate I, figs B. and C) is formed of crossed fibres cemented together where they touch. The cement is very strong, and attempts to tear the net usually result in the fibres giving way, but not the joints. The fibres are flattened and ribbon-like ; and double, as in the case of silk spun by a silkworm. The *Hydropsyche* larva possesses two large silk glands, each communicating with a duct. The pair of ducts open at the tip of the labium just underneath the mouth and in the process of spinning the two fibres produced are cemented together. Little seems to be known of the chemical composition or of the formation of the fibres and cement in caddis larvae. They resemble those of the silkworm in some respects, but there are marked differences. In the silkworm the fibres (fibroin) and the cementing substance (serecin) harden in air. The corresponding substances produced by the caddis larva harden in water.

The plankton nets vary in size according to the space to be covered, but usually measure from 5 to 7 mm. across. The size and shape of the mesh vary too. The majority of the mesh are rectangular with the longer side, ranging from 0.2 to 0.3 mm., and the shorter from 0.1 to 0.15 mm. Along the middle of the net irregular quadrilateral and triangular figures (Plate I, fig. C) form a kind of seam which is probably responsible for the bulge in the net.

Two kinds of double fibres can be recognised, one with a constant width (21μ) and running in a nearly straight line forms the shorter sides of the rectangle (horizontal in fig. B), the other forming the longer side of the rectangle (vertical in fig. B) is 15μ in its thinnest part but shows considerable dilations at the points where it crosses the wider fibres. These dilations are of special interest and will be referred to later.

JUL 27 1949

Attempts were made to induce larvae to build a plankton net in a round dish in which a jet of water impinging near the edge caused the water in the dish to swirl round. In each case the leaf was fastened and a web made, but no plankton net. Failure may have been due to the fact that I was unable to supply plankton as food.

Experiments carried out in the United States by Noyes (1914) were more successful. Part of a stream was diverted and made to flow along grooved boards $\frac{1}{4}$ in. by $\frac{1}{4}$ in., and plankton nets were formed. The time required for building web and net varied from $2\frac{1}{2}$ to 3 hours. Noyes says that there appeared to be no definite order in which the work was done and either net or web might be spun first and she adds that in some instances a larva would leave the net and go back to add a few threads to the web. Several species of *Hydropsyche* were experimented upon but specific determinations were not made. A glance at the regularity of the mesh and the quality of the workmanship make it difficult to understand how the net could be formed with such lack of method. There is another point to be considered. The differences between the fibres on the short sides and on the long sides of the rectangles have already been mentioned—fibres of the short sides are even in thickness while those of the long sides are dilated at the joints. Alm (1926) states that the fibres when first produced are adhesive, either to other objects or to one another. This would suggest that the fibres forming the short sides are spun first and are freely suspended, whilst the fibres of the long sides are formed afterwards and, where they touch those of the short sides, splay out before hardening. Wesenberg-Lund says that a special cement is used at the junction. This matter requires further investigation, if and when suitable conditions can be provided.

Most of my observations were made in Adel Beck, Leeds. Fully grown larvae occur in the spring ; pupal cases formed of small stones appear at the end of April. The winged caddis was taken from June to August. From the beginning of October to the middle of November webs and nets were found. Those seen in November had incorporated small stones. This agrees with Wesenberg-Lund's observations on *H. angustipennis*. He adds that from December to April no nets were found and the larvae were rolled up and sheltering in small holes and under stones.

It has been suggested by Continental writers that the tufts of bristles on the anal claspers are used for cleaning the net. This is denied by Noyes, who says that she has never seen them used in this way and that particles are removed from the net by the mouth appendages.

The specific identification of the larvae presented me with a difficulty as attempts to rear them in an aquarium failed. Pupae, on the other hand, are not so difficult and imagoes, including males, were reared and identified. Larval *exuviae* were easily obtained from the vacated pupal case. Examination of the clypeus, meso- and metanota, labrum and mandibles from this source showed them to be identical in form and markings with corresponding parts in the larvae taken from the web. Moreover, they agreed with drawings and descriptions of the larvae of *H. angustipennis* given by Silfvenius (1905) and Ulmer (2909).

I wish to express my best thanks to Mr. A. E. Winter for kindly photographing the nets shown on Plate I, figs. C and D, and also to Mr. W. D. Hincks for means of access to some of the literature to which reference has been made.

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MATERIAL FOR A STUDY OF TREE REGENERATION

H. TORDOFF, M.A., B.SC. AND E. DEARING, B.SC.

THE incomplete nature of present understanding of processes involved in tree regeneration being recognised, it is considered that any advance towards a better knowledge of the functional ecology of woodland would be of practical importance to both academic and forestry students alike. The purpose of this paper is to outline a sample of the materials available for such a study in West Yorkshire, and to invite the attention of biologists to some of the problems involved. Since these are varied in nature they are solvable only by team-work, involving specialists in every aspect of plant and animal ecology.

Shelf Wood, situated five miles south-west of Bradford, between Shelf and Norwood Green, presents a range of materials for such a study, and is representative of a large number of West Yorkshire woodlands occurring on non-calcareous soils. The woods, at an altitude from 425 to 775 ft., cover a narrow branched valley which has an easterly slope of 1 in 20 and is bounded by steep sides of gradient varying between 1 in 3 and 1 in 12. The valley has been cut through Elland Flags, above and below which lie Shales ; and from these the heavy clayey soils typical of the area are derived.

The following table summarises data collected from the rooting zone of tree seedlings throughout the area.

Table I. Soil Data

Dominant Tree	*p*H	NO_3	Ferric Iron	Carbonate less than 3%	% Organic matter of wet weight	% loss in weight on drying	No. of Bacteria per gramme of wet soil
Sycamore	7·4	—	—	—	28·0	32·5	17,666 thous.
Oak (*a*)	7·4	—	—	—	27·0	38·6	3,566 thous.
Oak (*b*)	7·2	—	—	—	23·6	19·4	9,100 thous.
Elm	7·2	—	—	—	18·2	23·0	960 thous.
Ash	7·2	—	—	—	27·8	51·3	43,400 thous.
Beech	7·6	—	—	—	51·6	53·7	43,500 thous.

(*a*) Oak associated with *Holcus mollis*.
(*b*) Oak associated with *Pteridium aquilinum* and *Deschampsia flexuosa*

The B.D.H. Capillator used in more than 100 determinations was checked against standard Buffer Solution ; the reactions of all soils examined were uniformly in the region of neutrality. In order to investigate the possible correlation of *p*H and individual species, determinations were made for the soil from herbaceous rooting systems in various associations. This data is presented in tables included in the account of each association.

Organic matter content is relatively constant, showing its only notable increase above average in Beech dominant association on a low level site where little accumulation was assisted by gravity and wind-movement. Highest water and bacterial contents were recorded from sites near stream-level. Graph I depicts the percentage loss in weight on air-drying soils taken from the herbaceous rooting zone at various altitudes above the stream-bed. The water-content varies inversely with the height above stream-level on ascent of the valley side. On gentler field slopes, adjoining the woodland, soil water content showed a sharp rise to 30 per cent.

Climatic conditions are typical of south-west Yorkshire ; average winter and summer temperature being 38° F. and 59° F. respectively, prevailing wind south-westerly, mean annual rainfall 30-35 in. varying monthly from 0·5 to 6·0 in.

Light intensities were recorded at a number of points at right-angles to the length of the valley using an ' Avo ' direct reading light meter on a bright sunny day in August. In this case it was apparent that light intensity varied directly with the altitude above stream-level. (See Graph II.)

In view of the likely importance of light intensities, further measurements have been made under individual shading species. These are presented in the descriptions of associations.

Four woodland types were recognised, namely : Sycamore, Oak, Beech, and mixed woodland.

In **Sycamore Woodland** the tree stratum was composed of *Acer Pseudo-platanus* with only occasional *Ulmus glabra,* forming discontinuous canopy at a height of 30-40 ft., casting a dense but broken shade, accentuated by the ravine-like configuration of the ground. No shrub layer occurred and it was possible to divide the herbaceous flora into two groups which were :

(*a*) Perennial Herbs

Hedera Helix, Mnium hornum and *Plagiothecium elegans* provided less than 10 per cent. ground cover throughout the year, mosses being confined to sites where high soil water contents occurred. *Dryopteris Filix-mas* alone comprised 80 per cent. cover on the northern slope where no other plants occurred.

(*b*) Ephemeral Herbs

In large numbers, but of only a few species, grew in a seasonal sequence on the slope of southern aspect.

Mid-March to April .	*Ranunculus Ficaria* and *Anemone nemorosa* . .	30% Ground Cover.
April to June . .	*Allium ursinum* with occas. *Arum maculatum* . .	60% ,, ,,
June to August .	*Mercurialis perennis* and *Circaea lutetiana* . .	60% ,, ,,

In the wood, Sycamore seedlings and grasses were rare, scattered on both slopes. There is an almost entire absence of seedlings of more than two years' growth ; no Elm seedlings were observed. Evidence of viable seeds of both species was found in that in fields bordering the wood seedlings of both species occurred up to one year old, before they were destroyed by grazing. Such a site presented only lateral shade and gentler topography made for higher soil water content than on the steep woodland slopes.

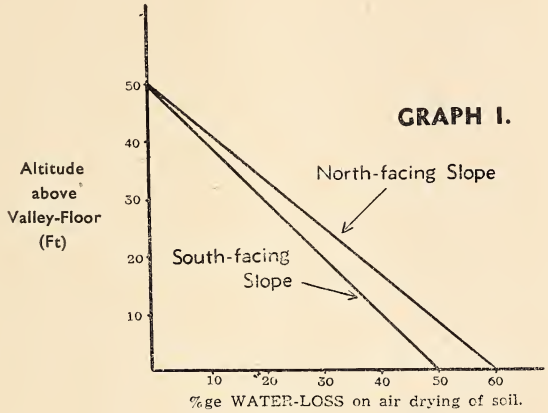
Oak Woodland was divisible on the basis of the dominant herb with which it was associated.

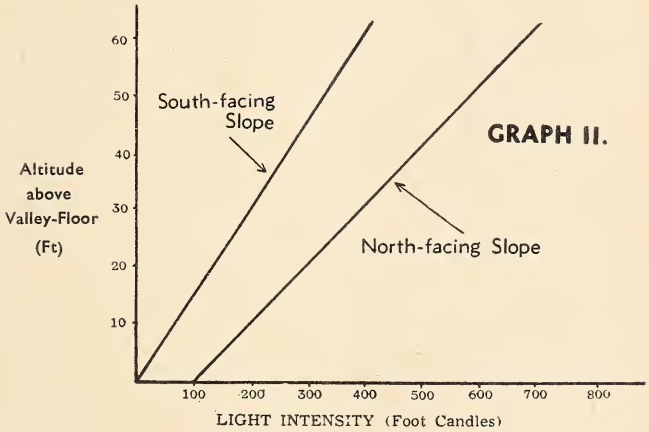
(*a*) *Deschampsia flexuosa* provided 60 per cent. ground cover on the south-facing slope formerly carrying a stand of *Quercus petraea* averaging 40 ft. in height. Most of these trees were felled during the war of 1914-1918. The tree stratum is now represented by widely scattered oaks of coppice origin, less than 20 ft. tall, one stool bearing two or three stems. *Pteridium aquilinum* showed full development in August when 50 per cent. cover was provided above the grass layer. Where the Oak had been removed entirely, especially on the higher slopes, a shrub growth of *Ulex europaeus* and *Sarothamnus scoparius* was noted. A dense stratum of *Vaccinium Myrtillus* was in association with this. One to five-year-old Oak seedlings occurred rarely.

Holcus mollis and *Teucrium Scorodonia* formed frequent patches throughout, particularly on areas subjected to trampling by man. On sites which had been burnt over the following species invaded the bare soil within the year : *Ranunculus acris, Cerastium vulgatum, Spergula arvensis, Trifolium pratense, Rubus* sp., *Rosa canina* agg., *Chamaenerion angustifoliun, Solidago Virgaurea, Senecio vulgaris, Digitalis purpurea, Polygonum aviculare* agg., *P. Convolvulus, P. Bistorta,*

Urtica dioica, Luzula sylvatica, Poa annua and *Nardus stricta.* The absence of Composite and Umbelliferous species is noteworthy as is that of *Cytisus* in particular. Landslides occur which carry well-grown trees down the clay slopes. The bare slopes are first colonised by *Deschampsia flexuosa.*

(*b*) *Holcus mollis* provides 80 per cent. ground cover beneath standard Oaks





growing in lateral canopy. 20 per cent. ground cover is provided by *Scilla non-scripta* followed later by scattered *Pteridium aquilinum.*

Both Oakwood associations being subject to heavy cropping by rabbits and probably hares, very rarely does a seedling attain sapling size which would enable it better to resist attack.

A small stand of **Beech** some 80 ft. tall, occupies a flat meander belt beside the stream in the southern half of the wood. There a heavy clay underlies one to two inches of compacted amorphous humus. In Table 1 the percentage of organic matter refers to samples taken from the transition layer between the soil proper and the humus layer. The percentage of available water refers to that contained in the soil proper within 6 ft. of the stream side.

Light intensities and *p*H values recorded along a transect running beneath the dense shade of a Beech and down the slope towards the stream, together with the distribution of vegetation, are tabulated below.

Height above Stream Level	No. of Vascular Plants per sq. yard	Light intensity foot candles	*p*H
0-1 ft.	45	100	7·4
	35	70	7·4
	20	20	7·4
1 ft. to level Plain	0	10	8·6
1-10 ft.	20	30	7·6
	45	230	7·2

The occurrence of herbaceous species at various light intensities is as follows:

Light intensity in foot candles	Species	% Cover
230 (No overhead shade)	*Pteridium aquilinum* *Holcus mollis* *Scilla non-scripta* *Deschampsia flexuosa*	100
100 (At the stream-side lateral shade)	*Circaea lutetiana* *Dryopteris Filix-mas* agg. *Geranium Robertianum* *Phalaris arundinacea*	70
70	*Deschampsia flexuosa*	70
20 (Varying degrees of shade overhead)	*Fagus sylvatica* (1 year seedling) *Acer Pseudo-platanus* (1 year seedling)	5

The *p*H is relatively constant, rising only in a local depression into which bases might be expected to be washed. Light intensity, however, varies markedly with distance from the shade-producing tree, the percentage and nature of ground cover and light intensity appearing to be correlated. 60 per cent. at least of the total ground area had a light intensity less than ten foot candles and no vegetative cover. On the periphery of this zone the occasional one-year-old tree seedlings were found in the shade of a Beech sapling some 15 ft. tall.

Mixed Woodland is characterised by a tree layer containing chiefly Sycamore, Oak, Beech and Elm with occasional *Fraxinus excelsior* and *Sorbus aucuparia*. The proportions in which they occur is very variable, the species mixture being rather one by groups of five or more trees than by individuals. The shrub layer so characteristic of this association consists of *Ilex aquifolium*, *Rosa canina* agg., *Crataegus oxyacanthoides*, *Sambucus nigra* and *Corylus Avellana*.

The association of tree cover and herbaceous layer with light intensity as measured at the level of the latter stratum and *p*H determined in the rooting zone is shown on the next page.

*p*H is relatively constant. Although there is no association between any particular tree-cover and light intensity, growth of *Deschampsia flexuosa* and *Holcus mollis* is directly related to light intensity. In areas of optimum *Holcus* concentration Oak seedlings aged up to five years are more frequent than elsewhere in the whole area, attaining an average frequency of one seedling per 100 sq. yds.

	Shade producing Species	Herbaceous Species	Light Int.	*p*H
North-facing Slope	*Sorbus aucuparia*	*Chrysosplenuim oppositifolium*	100	7·2
	Fraxinus excelsior	*Holcus mollis*	250	8·2
	Viburnum Opulus	*Heracleum Spondylium*	140	7·2
	Acer Pseudo-platanus	*Holcus mollis*	140	7·2
South-facing Slope	*Fraxinus excelsior*	*Acer Pseudo-platanus* (1-year seedling)	40	7·4
	Acer Pseudo-platanus	*Stachys sylvatica*	20	7·4
	Quercus petraea	*Pteridium aquilinum*	80	6·8
	Fagus sylvatica	*Holcus mollis*	20	8·2
	,, ,,	,, ,,	250	7·2
	,, ,,	,, ,,	600	6·8
	Quercus petraea	,, ,,	420	6·5
West-facing Slope	None	*Achillea Millefolium*	600	7·0
	Ilex aquifolium	*Poa annua*	100	7·2
	Quercus petraea	*Holcus mollis*	120	7·8
	,, ,,	*Luzula sylvatica*	200	7·4
	None	*Quercus* seedling	250	7·2
	Acer Pseudo-platanus	*Dryopteris Filix-mas* agg.	250	7·2
	,, ,,	*Oxalis Acetosella*	140	7·0
	Composite canopy of *Acer Pseudo-platanus* and *Quercus petraea*	*Scilla non-scripta*	140	7·2
	,, ,,	*Chrysosplenium oppositifolium*	130	7·2
East-facing Slope	Composite canopy of *Acer Pseudo-platanus* and *Quercus petraea*	*Solanum Dulcamara*	140	7·2
	Ulmus glabra	*Dryopteris Filix-mas* agg.	160	8·0
	Acer Pseudo-platanus	*Holcus mollis*	100	7·4
	Quercus petraea	*Poa annua*	130	6·8
	Acer Pseudo-platanus	*Polygonum Bistorta*	140	7·2

The upper herbaceous layer is composed of *Pteridium* on the upper part of the south-facing slope where high light intensity is accompanied by low water content, and therefore high soil-air volumes, produced by free drainage along the planes of Elland Flags. *Dryopteris Filix-mas* agg. is confined principally to sites of low light intensity on north-facing slopes, achieving a maximum size at stream-level where water content is highest.

On the level margin of the wood occasional tree seedlings appear, but these apparently survive grazing for only a limited period since plants of sapling size are rare. The herbaceous flora is similar in specific composition to that of the stream-side where, although light intensities are different, water content is similar. Characteristic species are : *Solidago Virgaurea, Trifolium medium, Stachys sylvatica, Sanguisorba officinale, Heracleum Spondylium* and *Filipendula ulmaria.*

The woodland associations so briefly surveyed are characterised by an extreme paucity of seedling trees and saplings. Elucidation of factors controlling regeneration of such associations involves study of many facets of the problem amongst which the following are prominent.

Reproduction from Seed

Seed Production. The number of healthy seed-bearing trees is apparently adequate for the production of sufficient quantities of seed for numbers of seedlings far in excess of those counted. In the *Quercus-Deschampsia* association, however, the effective stocking of seed trees is very small ; those present bear poorly-developed crowns and large gaps occur caused by felling and slow coppice regrowth.

It is well known that *Quercus* and *Fagus* show a marked periodicity of seed-setting which varies with the tree's geographical and ecological position.

The seed output of dominant tree species must be determined before full interpretation of the results of viability referred to in the following paragraph is possible.

Seed Dispersal. *Quercus* and *Fagus* having large and heavy seeds are unlikely colonists of sites other than those which may be reached by seed-fall under the influence of gravity. Seeds of *Acer, Ulmus* and *Fraxinus*, on the other hand, are readily wind borne. Local topographical detail is likely to exert a considerable influence in the determination of movement of seeds of all types, both by influencing air-currents and by providing inclined planes and lodgements. Further influence will be provided by the seed-eating birds and animals of the area. Detailed observations are necessary to detect any general directions of seed movement.

Seed Destruction. Fungal, insect and vertebrate pests of tree seed crops are not sufficiently numerous to limit tree regeneration in a healthy association. If, however, the seed supply is reduced, e.g. by cutting, or death from *Armillaria mellea*, attack of *Quercus*, then the destructive attacks of long-tailed field mice might have a more pronounced effect on the number of seedlings produced. Wood Pigeons are generally discredited with the destruction of Beech mast. Inter-relation of organisms with their food supplies remain to be determined by observation and experiment. Selective exclusion of avian and mammalian pests from seed-covered sites and not from others immediately suggests itself.

Substratum for Germination. As each tree species requires a certain combination of physical and biological factors for germination, it follows that the number of suitable sites in any area is not infinite. Rocky slopes may be too dry for germination ; water saturated soils may suffer from oxygen deficiency. Again the only method of mapping the ' potential germination areas ' will be by experiments with seeds in the field.

Substratum for Establishment. As with germination seedling establishment of a species requires presence and absence of certain factors, e.g. *Deschampsia flexuosa* produces a dense root-mat which will probably prevent the Oak radicle from penetrating into the mineral soil necessary for establishment. Thus any factor which favours the increase of *Deschampsia* rather than the non-mat-forming *Holcus* may reduce the chances of a viable seed reaching an establishment site. At one place *Deschampsia* occurred within a few yards of *Holcus*, the former associated with stunted Oak coppice, the latter with 40-ft. tall standard Oak.

Factors terminating Establishment. Grazing by domestic or wild animals and damage by man are likely to reduce the number of established seedlings. The importance of each agent could be examined by exclusion experiments. Inter and intra-specific root competition and their effects on seedling establishment can be investigated by weeding and trenching techniques to compare the growth of isolated and non-isolated plants.

The possibility of a disease being responsible for the paucity of regeneration should be borne in mind, and mycologists might conduct surveys of seedlings.

Light conditions show large variations, both within and between associations, such as may account for quantitative and qualitative differences in tree establishment.

Vegetative Reproduction. Only in Oak and Beech has seedling coppice been rarely observed whilst coppice from adult stools of Oak has been frequent. Coppicing merely delays the process of woodland destruction if no seedling recruitment occurs, since no stool can produce coppice shoots indefinitely.

The problems thus briefly sketched might well repay the attention of teams of biologists who have special local knowledge and access to woods of which that at Shelf is but an example. The processes of tree regeneration so elucidated would not only be valued contributions to the field of plant ecology, but of great practical importance to forestry.

The nomenclature follows that of the Check-list of British Vascular Plants issued by the British Ecological Society, 1946.

BRYOLOGICAL NOTES AND RECORDS

Some Mosses of the Hodder Valley, V.C. 64.—Wheldon and Wilson, in their *Flora of West Lancashire*, give an interesting list of mosses from the banks of the River Hodder, a tributary of the Ribble, below Whitewell, and it seemed likely that the same species would also occur on the Yorkshire side in V.C. 64. The fact that the district has been little worked in the past was an added inducement to pay a visit, and the following mosses were seen on May 1st, 1949. The best things on the list are *Zygodon conoideus* Hook. & Tayl. c.fr., new to V.C. 64, and, something I had never seen before, fruiting plants of *Campylopus flexuosus* Brid.

ABOUT WHITEWELL

Polytrichum aloides Hedw. c.fr.
P. gracile Dicks. c.fr.
Dicranoweisia cirrata Lindb. c.fr.
Campylopus flexuosus Brid. c.fr.
C. fragilis B. & S.
Dicranum scoparium Hedw.
Trichostomum tortuosum Dixon.
T. mutabile Bruch.
Orthotrichum cupulatum Hoffm. c.fr.
Neckera crispa Hedw.
N. complanata Huebn.
Eurhynchium praelongum Hobk.
E. pumilum Schp. (det. J. B. Duncan).
Plagiothecium undulatum B. & S.
P. silvaticum B. & S.
Hypnum molluscum Hedw.
H. stellatum Schreb.

RIVERSIDE WOODS BELOW WHITEWELL

Tetraphis pellucida Hedw.
Dichodontium pellucidum Schp.
Fissidens adiantoides Hedw.
F. taxifolius Hedw.
Tortula subulata Hedw. c.fr.
Barbula spadicea Mitt. (det. W. Watson)
Trichostomum crispulum Brid. c.fr. (conft. W. Watson).
Zygodon conoideus Hook. & Tayl. c.fr. (conft. W. Watson), new to V.C. 64.
Mnium undulatum L.
M. punctatum L.
M. serratum Schrad.
Orthothecium intricatum B. & S.
Amblystegium serpens B. & S. c.fr. (conft. J.B.D.).
Hypnum commutatum Hedw.
Brachythecium rivulare B. & S.

LIMESTONE ROCKS BELOW INGS WOOD (SOUTH OF WHITEWELL)

Orthotrichum anomalum Hedw. var. *saxatile* Milde c.fr.
Webera carnea Schp.
Thuidium tamariscinum B. & S.

RIVERSIDE ROCKS SOUTH OF HORSE HEY

Weisia verticillata Brid. c.fr.
W. rupestris C.M.
Plagiothecium denticulatum B. & S.
Hypnum palustre Huds. c.fr. (det. J.B.D.).

The hepatic, *Nowellia curvifolia* (Dicks.) Mitt. was seen growing on an old stump a little below Whitewell.—G. A. Shaw.

***Riccia bifurca* Hoffm.—A Hepatic new to Yorkshire.**—In the Austwick area the wet summer of 1948 favoured the growth of species of *Riccia*. These hepatics form small rosette-like growths on bare soil. In autumn I received from

Mr. C. A. Cheetham a collection which proved to be mainly *R. Beyrichiana* and *R. glauca*, with a smaller amount of *R. sorocarpa*. An isolated rosette agreed with the description of *R. bifurca*, a species not previously recorded for the county. The purple colouration on the underside of the thallus was only slightly developed and could hardly be relied upon in diagnosis. Fortunately sporangia with mature spores were present in the thallus and the smaller spores, distinctive from *R. Beyrichiana*, and the section shape of the thallus, made identification possible. Dr. E. W. Jones, confirming the record, gives the size of the spores as about 87μ compared with the 75-90μ in Macvicar's Hepatics. The record is based upon a single rosette and the exact locality is not known, but the presence of spores would indicate reproductive capactity and it is hoped that further search will reveal more of it.—H. Walsh.

A herbarium record of *Sphenolobus exsectiformis* (Breidl.) Steph., a Hepatic new to V.C. 63.—In the autumn of 1912, the bryologists W. Watson, the late D. A. Jones and H. C. Broome visited Hardcastle Crags, Hebden Bridge, under the guidance of the late J. Needham. *Lophozia atlantica*, recorded there in 1904 by Wm. Ingham, was no doubt the chief attraction, but in addition to this a few hepatics not previously recorded for that area were collected. H. C. Broome undertook the naming, but owing to some delay the packet containing *S. exsectiformis* was not returned until after the death of Needham in 1913. In 1914 the late C. Crossland, his co-worker, received the packet and after noting the record in his copy of the *Halifax Flora* (Crump & Crossland, 1904), he placed the packet among his bryophyte collection now lodged at Belle Vue Museum, Halifax. The record was never published either with the Y.N.U. or Moss Exchange Club. The packet, bearing the date 1912, is in the handwriting of H. C. Broome with added particulars by C. Crossland.—H. Walsh.

Nowellia curvifolia (Dicks.) Mitt.—The hepatic *Nowellia curvifolia* is generally looked upon as being uncommon in Yorkshire. This is not true of parts of V.C. 64 ; I have come across it three times during the last year. The first occasion was during the visit of the Y.N.U. to Malham on June 5th, 1948. It was growing in some quantity on a fallen log on the Tarn Moss. The next gathering was from a rotten tree trunk in an open wood at Conistone Cold on March 24th, 1949. At the beginning of May it was very abundant in Birks Wood, Buckden, Wharfedale. One fallen tree was so covered with it that it showed the reddish-brown colour from quite a distance.—A. Thompson.

Y.N.U. Bryologists at Plompton Rocks—The fine sunny weather which favoured the section on a visit to this area near Harrogate was enjoyable, but one left with a slight feeling of disappointment, for the lakeside, rocks and woodland cannot be said to be rich in bryophytes. The only hepatics seen were the common ones generally associated with a wooded gritstone area and the same with a few exceptions could be said for the mosses. One of the latter, *Dicranum strictum*, recorded for Plompton in 1925 and only known from three other Yorkshire stations was found and many members were able to see this for the first time. A nice patch of the luminous moss, *Schistostega*, was noted well to the back of a rock fissure, the first record for Plompton. *Cynodontium Bruntoni*, recorded here in 1914, was found in a crevice in the rocks not much above the water. *Webera annotina* var. *bulbifera* was gathered in a young state but had already developed a number of its characteristic bulbils. These more resemble detached buds with rudimentary leaves than the more compact bulbils of the type. Ingleton is the only other record for the var. *bulbifera* in V.C.64. A small deposit of calcareous tufa was bearing *Weisia verticillata*, one of the mosses often found in this situation and absent from adjoining rocks. *Dicranoweisia cirrata* was seen in fruit in a few places, and one gathering without fruit had numerous stem bulbils. Plompton is regarded as one of the few recorded stations for *Orthodontium gracile* and in 1914 its variety *heterocarpum* was recorded about the time its rapidity of records for S.W. Yorkshire was causing considerable astonishment. Although the section paid close attention to this subject and quite a number of sites were found where *Orthodontium* flourished, none of the fruiting plants would with any confidence be placed as the type.—H. Walsh.

THE SEA-SHORE

H. HENSON, D.SC., PH.D., F.R.E.S.

It is with much pleasure that one greets the arrival of Professor C. M. Yonge's book *The Sea Shore*.* It is one of the best of the New Naturalist series both in composition and execution. The black and white photographs are excellent whilst the colour plates have been used with discretion and, except for two or three, leave little to be desired in terms of fidelity or pleasing display. Professor Yonge writes easily and with discrimination, and, without being superficial, always reaches the understanding of the general reader.

Beginning with an almost affectionate tribute to Philip Henry Gosse, who some hundred years ago introduced the shore to British naturalists, the author skilfully depicts the nature of the shore and its inhabitants. This introduction to the scene and *dramatis personae* gives one the impression of having been the author's major difficulty and one can admire his forbearance in not reminding his readers that the only way to acquire a sufficient knowledge of the shore animals is to see them.

The shore, where land and sea come together, is a place where marine plants can obtain the maximum of light, where the sea contributes the essential inorganic salts, and where animals can exploit the success of the plants and perhaps obtain some little relief from the greatest intensities of interspecific competition. The chapter on ' The background of the sea ' conveys a sense of the immense wealth of the ocean in plant nutrients and how little of them, relatively speaking, are actually brought into circulation—the sea deserts, lifeless from lack of phosphorus and nitrogen, become as real as the land deserts which merely lack the water. The ' Moulding of the shore ' gives an effective simple account of the action and reaction of the sea and land. A new and simple analysis of tide levels reveals the nature of the shore habitats and clearly demonstrates the vast differences that may exist between places only a few yards apart. The inhabitants of the upper shore between the extreme high water of spring tides and the average high-tide level may have to suffer days of exposure whilst only those below the high water of neap tides can rely on a regular daily submergence. The effects of these tidal zones are shown most clearly by the seaweeds and the author's ' trespass into the domain of the botanists ' only serves to emphasise his gift for imparting knowledge.

Having sketched the broad outlines of the factors common to all shores, Professor Yonge gives us in logical sequence a series of habitats, large and small, with indications of the special features of each and the adaptations of the animals to these special features. Life in rock pools for instance must be able to withstand a sudden change in temperature when the tide comes in ; on the upper shore there may be wide fluctuations in *p*H, correlated with fluctuations in the content of carbon dioxide by day and night, as well as fluctuations of salinity as the result of evaporation or the influx of fresh water. Animals of the more conspicuous sorts which can support such variable conditions are many anemones, sea-slugs, limpets, prawns, and certain seaweeds. Animals highly sensitive to such variables can only be expected in pools low on the shore, in fact only near low water of spring tides.

In contrast to the foregoing, in which the emphasis is on locality, we are next shown how a single group of animals, the shore fishes, can become specialised and adapted for their particular mode of life. The nest-building sticklebacks, the prawn-snatching *Cottus* and the blennies which bite off the barnacles are most engaging. The unusual features in which the males guard the eggs, and fins are modified into suckers, give much food for speculative analysis of evolutionary processes. Of them all perhaps the pipe fishes with their sucking tubes and brood pouches are the most alluring.

The barnacles and molluscs form an enormous assemblage on a rocky shore, often competing with one another for a few square inches. This can be appreciated a little more vividly perhaps when it is learned that certain shores in the Isle of Man have some thousand million barnacles to the kilometre. The ' homing ' of the limpet, the feeding of the dog whelk and the zoning of the periwinkles make most interesting reading. The homing instincts of the limpet, whilst clearly

* *The Sea-Shore* by C. M. Yonge. New Naturalist series, Vol. 12, Pp. 311, with 61 colour and 62 monochrome photographs, and 88 figures in the text. Collins, 21/-.

demonstrable have ' so far defied analysis and do not seem to reside within the powers of sight, smell or touch.' The four species of periwinkles (*Littorina*) make a biological study of their own. *Neritoides*, an inhabitant of the splash zone, is submerged only occasionally, in rough weather at spring tides. It is air breathing but liberates its eggs directly into the sea as opportunity offers during the winter. The young eventually settle on the middle shore and make their way up to the splash zone. *Rudis* also inhabits the higher parts of the shore but does not penetrate the splash zone ; it is viviparous and its young are deposited in the shore areas they will continue to inhabit. *Littoralis* (*obtusata*) occurs amongst the fucoid weeds on which it lays gelatinous masses of eggs. It is not air breathing but its young do not have to suffer the hazards of life in the plankton. *Littorea*, the common periwinkle, ranges from high water of neap tides to mean low water of spring tides and is able to exist on exposed rocks, amongst weeds, on gravel and even on sand. No other species of shore animal exists under such a variety of circumstances. To the amateur naturalist or young student such information is of great value. It gives purpose and direction to personal study and its presentation evokes nothing but warm unqualified approval.

The wealth of life under seaweeds and boulders is dealt with in detail, starfishes, worms, sponges and crabs all find their appropriate place. The hermit crab with the anemone perched on its shell is a surprising partnership, but one which works very well. The anemone can feed on the crumbs which fall from the crab's table whilst by its mere presence it warns off predatory fish and such animals as are held at bay by stinging namatocysts.

Many have known for a long time that scallops could swim by flapping the shell valves but not all will have appreciated that the gape of the shell goes forwards and that the animal progresses by taking successive bites, as it were, out of the water. Professor Yonge's account stimulates the imagination by describing the appropriate closely co-ordinated positioning of the mantle flaps which gives a particular type of swimming motion. One is left wondering at the possibilities of the simple bivalve organisation and the possibilities of the simplest of molluscan nervous systems. One wonders, too, whether the scallop shown in plate 34 could ever swim with its attached *Laminarians*.

Of the rock borers it would seem that the boring sponge makes its way by treating the rock with acid but the larger molluscs such as *Hiatella* (*Saxicava*) and *Pholas* bore by abrading the rock. The story is completed by the description of the shipworm (*Teredo*) where the shell has become merely a boring tool. Once again the author stirs the curiosity of his reader with the simple statement that although a ship's timbers may be riddled with *Teredo* the burrows never break into one another.

The final chapters are devoted to sandy shores, muddy shores and estuaries. A little technology is introduced in relation to oyster beds, the preparation of alginate fibres from seaweeds, and the effect of fouling of ship bottoms by sedentary organisms. This last apparently can increase fuel consumption by some 20 per cent.

Thus having introduced the reader to many animals, their habitats, their modes of feeding and reproducing, the book takes him naturally and easily to the more subtle biological problems associated with shores. The zoning of the periwinkles for instance seems to depend on delicately balanced gravity responses. If the animal is too long submerged it moves up shore but if too long exposed it develops a positive gravity response and moves down shore. Again the distribution of animals round our shores is an effect of temperature and other environmental factors on their growth and spawning. Finally there emerges every indication that the evolution of land animals proceeded by two routes, the vertebrata *via* the estuaries to fresh water and marsh land, and at least some invertebrates directly from the upper shore. *Littorina rudis*, for example, needs little further modification to become a land snail, except that in modern times the appropriate land habitats are already securely held and success could not be achieved without overcoming opposition from established competitors.

It is hoped that this article will have given some idea of the range, the scope and the excellence of this book.

The Naturalist

THE COLEOPTERA OF ASKHAM BOG

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Askham Bog represents all that now remains of swamp conditions that extended over much of the Vale of York after the Ice Ages, and is of particular interest owing to the survival there of much of the original flora and fauna. For more than a century the richness of the coleopterous fauna has been recognised and the locality has been visited by many well-known entomologists. The need for preserving these unique conditions became apparent and in 1946 Askham Bog was taken over as a Nature Reserve by the Yorkshire Naturalists' Trust, Ltd.

No recent or complete survey of the beetles found at Askham Bog is, however, in existence. In 1946 Bootham School published their *Survey of Askham Bog*, but this did not encompass the study of the coleoptera beyond the mention of three common aquatic species. The present writer has therefore undertaken the examination and co-ordination of the many and scattered records which exist, with the hope that this may form the basis for the future study of this most interesting locality.

Published records are to be found in the *Victoria County History* list of Yorkshire beetles, but this contains barely 100 species from Askham Bog. Both Canon Fowler (4) and Rev. W. C. Hey (6) published lists of some of the aquatic species they had found and a number of papers by other writers have appeared in *The Naturalist* and other journals, mostly listing species in this group. References to the more important of these papers are given at the end of the present work. Numerous records are also to be found in the annual reports of the Yorkshire Naturalists' Union Coleoptera Section. Above all, there are the Fordham Records, stored by the Y.N.U. at the Yorkshire Museum. These have proved invaluable for tracing the older data, but as far as possible the original publications have been examined. This unique manuscript also contains a number of records, including many under the late Mr. W. J. Fordham's own initials, but without further reference. It is possible that they are now being published for the first time. From all this material, records of some 331 species have been gathered together.

In addition to the published material, the data labels of specimens in the various collections in the Yorkshire Museum were examined. Amongst these is the Hey collection of Yorkshire coleoptera, but, unfortunately, there are no data attached to these specimens and much useful information is thus unavailable. The writer is indebted to a number of entomologists for permission to examine unidentified specimens taken at Askham Bog, the majority being those collected by Mr. Arthur Smith during the 1948 and previous seasons. Also Mr. W. D. Hincks most generously supplied a long list of his unpublished records, including some 30 species new to the list. Finally the writer himself visited the locality some dozen or more times during the 1948 season, making as wide a collection as possible, with the exception of the aquatic species. A combination of all these sources produced some 90 species new to the List. Four of these are, according to the Fordham Records, new to Yorkshire.

To increase the usefulness of the present list, the distribution throughout Yorkshire of each species has been extracted from the *Victoria County History* or other available source, and any species which has been noted as common at Askham Bog in recent years has been so noted. Much of the latter information has been obtained from the notes, both published and unpublished, of Mr. Hincks. Space has not permitted the inclusion of the very interesting biological data often given by this writer. It will be noted that some 16 of the rarer species have been found, in Yorkshire, only at Askham Bog (marked AB in the distribution column). Some five of these have not, however, been seen again since they were first taken some 50 to 100 years ago. Of the remainder, as mentioned above, four are new records.

A close study of the records leads to some interesting conclusions. More than 25 per cent. of the species are of aquatic habits. This is not surprising, since it was for these that Askham Bog became famous towards the end of the last century. It is apparent, however, that many of these records refer to Chaloner's Whin and not to Askham Bog proper. This is actually stated by some writers and such records have been marked (†) in the text. This fact may not have been realised by certain recent authors who have claimed that the locality is not what it used to be. This is, in fact, probably the case at Askham Bog proper, which has shown

some degree of drying up during the last 20 years. Present activities of the Yorkshire Naturalists' Trust may, it is hoped, have some effect in arresting this tendency and so, maybe, in restoring some of the original fauna.

By far the greater proportion of the aquatic species were recorded round about 1900 when most of the famous entomologists of that day visited the locality. Since then, these species were examined in 1930 by Mr. G. B. Walsh, and again in 1942 by Mr. Hincks. No data is available on the prevalence of the aquatic species at the present time, especially at Chaloner's Whin, which is not as yet part of the Nature Reserve and has not for some years been accessible for investigation. It is, moreover, doubtful whether such an estimation would be advisable until some five or ten years have elapsed, by which time the locality may have settled down as a Nature Reserve.

On the remaining species far too little work has been done, although the locality shows signs of being equally rich in rare and local species, especially amongst the Phytophaga. Recent records by Mr. Hincks and the present writer have added a considerable number of species to this group, especially amongst the Flea-beetles, which seem practically to have been unworked.

Records of the Weevils are also of interest ; by far the greater proportion were made during the last 20 years and a third are new records. This may well be correlated with the gradual fall in the water table.

That the present list covers all, even of the commoner species, of course, cannot be claimed. Many groups await the systematic work that the aquatic species have received, notably the many forms inhabiting the very extensive area of Sphagnum (*vide* Pearce (11) on the Pselaphidae), and the large genera of *Bembidion*, *Apion* and *Meligethes*, all of which are probably far more widely represented than is at present recorded. It is hoped, therefore, that a knowledge of what is already known of the locality will lead to further study of the more neglected groups. Moreover, as the list of species and their relative abundance nears completion, this now almost isolated habitat should prove an ideal site for ecotopic studies.

To those who are not familiar with Askham Bog, some description of the vegetation, with its inhabiting beetles, may be useful. For much of the information on the botanical ecology the writer is indebted to the Bootham School *Survey* and the unpublished thesis written by Miss N. Day in 1933. The attached map is a simplified version compiled from these two sources and brought up to date (winter, 1948-49).

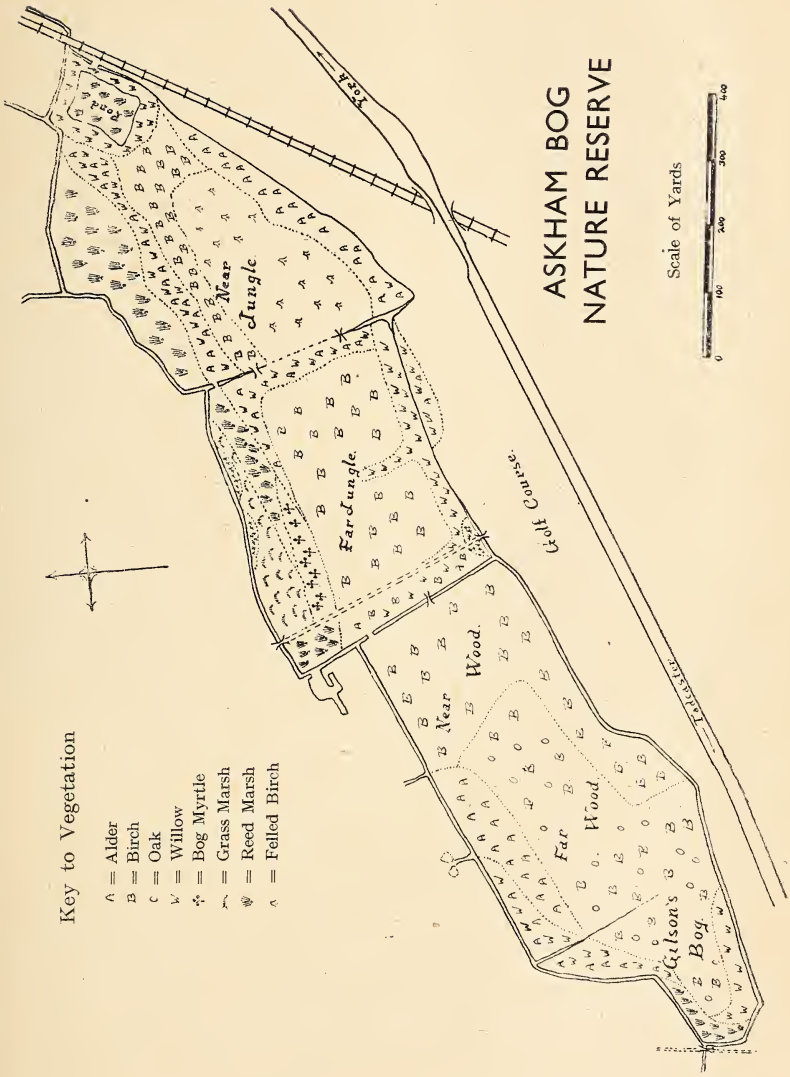
The Reserve is entered from the golf course by a path which traverses the southern end of the Far Jungle. An open ditch lies some yards to the left of the path dividing this section off from the Near Wood. The belt between the path and the ditch is of some interest to the coleopterist. Here are to be found many of the Phytophaga, such as *Cassida flaveola* Th., *Hydrothassa marginella* (L.), and many of the Coccinellidae. The ditch, which has recently been opened up, is at present one of the best sites for aquatic species, while on its banks are to be found *Elaphrus cupreus* Df. and *Prasocuris phellandrii* (L.) in numbers.

The ditch is crossed by a foot bridge and a blazed path leads into the Near Wood, a fairly dense Silver Birch association, and then on into the Far Wood, which is a Birch-Oak association. This, in the writer's experience, has proved the least productive area for coleoptera, although some of the Telephoridae are to be found here, as well as the various Weevils, etc., associated with the Oaks. Some of the best Sphagnum, however, lies in this section and may well prove productive if more closely investigated.

Gilson's Bog, at the far end, is divided off by another transverse ditch, now almost silted up. It is a more open Birch-Oak association, overlying cotton-grass, etc., and surrounded by a belt of Willow and Alder along the edge of the open ditch.

Returning to the main path across the Bog, on the right lies the main portion of the Far Jungle, a fairly open Silver Birch association, overlying Sphagnum and bordered by Willow and Willow-Alder associations. In this area are to be found many of the Staphylinidae, especially on the fallen timber, and the *Polyporus* growing on it. Numerous Carabidae are also here and probably most of the Longicornia.

On the further side of the Far Jungle is an open grass marsh. The sweep-net will here collect considerable numbers of Flea-beetles, especially *Aphthona coerulea* (Fc.), which is to be found in enormous numbers on the *Iris pseudacorus* L. The edge of the ditch which surrounds the Reserve is here somewhat drier and will


ASKHAM BOG
NATURE RESERVE
Scale of Yards
0
100
200
300
400
Key to Vegetation
A = Alder
B = Birch
C = Oak
W = Willow
Bog Myrtle
Grass Marsh
Reed Marsh
Felled Birch
Near Jungle
Far Jungle
Near Wood
Far Wood
Gilson's Bog
Golf Course
York

yield many interesting species of *Bembidion*. Here and by the transverse ditch many of the recorded *Donacia* could be found in the past. Askham Bog has not, however, proved very productive for this genus, although all the host plants listed by Stainforth (12) for the Yorkshire *Donacia* have been recorded in the locality. The writer found no representatives of this genus during 1948. Between this marsh and the more wooded area in the centre of the Far Jungle is a belt of *Myrica gale* L.

The Near Jungle can be entered by one of the two foot bridges which cross the almost silted-up ditch. At the southern end of this ditch standing water may yield some aquatic species. The vegetation towards the centre of the Near Jungle is a very open Silver Birch association, much of the timber having been felled or destroyed by a fire a few years ago.

On the northern side and divided off by a dense belt of Alder-Willow is an area of open marsh which is of great interest to the coleopterist. Large numbers of *Galerucella* spp. are to be found on the Docks and Willows, while *Apion* spp. are to be taken along the edge of the ditches.

At the furthest end of the Bog is the North Pond, which is now almost completely dry, being choked with *Phragmites*, etc. The main area of *Typha* is to be found here with its most interesting coleopterous fauna, as described by Hincks and Steel (9).

At the point where the boundary ditches pass under the railway is a section of fairly deep water. Many aquatic species, including *Dytiscus*, have been taken here.

The following abbreviations are used in the list :

WD = Widely distributed throughout Yorkshire.
AB = Yorkshire records only at Askham Bog.
L = Local in Yorkshire.
R = Rare in Yorkshire.
C = Common at Askham Bog.
V = Very.
† = Taken at Chaloner's Whin.
* = Previously unpublished record.

Collectors quoted by their initials only are as follows :

R. S. Bagnall.
M. D. Barnes.
E. G. Bayford.
T. H. Beare.
A. Beaumont.
E. C. Bedwell.
J. M. Brown.
R. Cook.
W. M. Crawford.
J. R. Dibb.
H. K. Donisthorpe.
J. H. Fidler.
J. D. Firth.
J. Flint.
W. J. Fordham.
W. W. Fowler.
W. C. Hey.
W. Hey.
W. D. Hincks.
H. Hutchinson.
T. B. Kitchen.
C. Large.
E. J. Pearce.
J. Preston.
C. W. Russell.
W. J. Saunders, etc. (includes C. Large and D. Picken).
W. E. Sharp.
A. Smith.
T. Stainforth.
W. O. Steel.
M. L. Thompson.
R. Wagstaffe.
G. B. Walsh.
E. A. Waterhouse.
J. Wood.
A. Wright.

Dates in brackets denote the year of publication and not necessarily of collection. The prefixed numerals refer to the 1930 Catalogue of T. H. Beare, this being the list on which the Fordham records are based and is in fact the one still used by many coleopterists. The nomenclature has, however, been amended to conform with the more modern views of Kloet and Hincks' Check List of 1945. The present list includes all known records up to December 31st, 1948.

In order that the data may be traced to the original literature, each record has been marked with a suffix referring to the journal in which it appeared :

A = *Naturalist*.
B = *Entomologist's Monthly Magazine*.
C = *Victoria County History* (1907).
D = *Naturalist's Journal*.
E = *Loudon's Natural History Magazine*.
F = Only in Fordham Records.
G = *Zoologist*.
H = *Transactions of the Y.N.U.*
J = *Entomologist*.

The writer is greatly indebted, in addition to those already mentioned, to Mr. R. Wagstaffe, of the Yorkshire Museum, for his continuous encouragement and for most constructive criticisms of the typescript.

9. *Carabus nemoralis* Müll. W.J.F., 19/4/24 [†, F], A.W., 1830 E] . . WD
34. *Leistus terminatus* (Hlg.). W.C.H., 1885 [F], J.H.F., 30/5/48 [*] . . WD/C
38. *Nebria degenerata* Scf. W.J.S., etc., 16/6/45 [A] L
41. *Helobium multipunctatum* (L.). A.W., 30/11/1830 [E], W.C.H. (1885) [F], W.W.F., 1881 [B], R.C., 1836 [C] L
42. *Elaphrus riparius* (L.). R.C., 1830 [F] . . . . . WD
43. *E. cupreus* Duft. A.S., 7/31 [*], J.H.F., 25/4/48 [*], W.C.H. (1886) [F] . WD/VC
45. *E. lapponicus* Gyll. R.C., 25/8/1842 [C] (teste W. C. Hey) . . . AB
46. *Loricera pilicornis* (F.). A.S., 4/31 [*], R.W., 7/42 [*] . . . . WD/C
58. *Dyschirius globosus* (Hbst.). J.H.F., 28/5/48 [*] . . . . . L/C
73. *Chlaenius nigricornis* (F.). R.W., 12/7/42 [A] L
75. *Oodes helopioides* (F.). W.W.F. (1881) [B], W.C.H., 1882 [C], A.S., 7/30 [*] L
78. *Stenolophus mixtus* (Hbst.). W.D.H., 24/7/43 [*] . . . . . AB
94. *Trichocellus placidus* (Gyll.). W.C.H., 1882 [C], W.J.S., etc., 16/6/45 [A], W.D.H. [*], 7/4/45, 17/6/45 . . . . . L/C
114. *Harpalus aeneus* (F.). A.S., 25/3/45 [*] . . . . . WD
139. *Stomis pumicatus* (Pnz.). A.S., 19/4/42 [*] . . . . . WD
147. *Feronia oblongopunctata* (F.). A.W., 1830 [E], E.G.B., 1905 [C], A.S., 9/5/48 [*] VL
155. *F. nigrita* (F.). A.S., 4/31 [*], R.W., 9/5/42 [*], J.H.F., 14/5/48 [*] . WD/VC
157. *F. minor* (Gyll.). W.J.F., 1910 [F], M.L.T., 24/6/22 [A], A.S., 9/5/48 [*]. R
158. *F. strenua* (Pnz.). W.D.H., 3/43 [A] . . . . . WD/C
162. *F. vernalis* (Pnz.). A.S. [*], 12/7/44, 8/5/48 L
189. *Amara aenea* (DGy.). A.S., 25/3/45 [*] . . . . . WD/C
205. *Agonum assimile* (Pkll.). A.S., 9/5/48 [*] . . . . . WD
208. *A. obscurum* (Hbst.). R.W., 7/42 [*], J.H.F., 25/4/48 [*] L
217. *A. viduum* (Pnz.). A.S. [*], 5/31, 9/5/48, J.H.F., 25/4/48 [*] . . . WD/VC
220. *A. scitulum* Djn. W.C.H., 5/18/95 [C] . . . . . AB
221. *A. fuliginosum* (Pnz.). A.W., 1830 [E], W.J.F., 1910 [F], 1925, M.L.T., 1925 [A], W.E.S., 1/9/13 [F], W.D.H., 3/43 [A], A.S., 25/4/48 [*], J.H.F., 9/3/48 [*] . . . . . WD/VC
222. *A. gracile* (Gyll.). M.L.T., 2/6/25 [A], A.S., 8/5/48 [* L
223. *A. piceum* (L.). M.L.T., 24/6/22 [†, A] L
226. *Odontonyx rotundatus* (Pkll.). R.W., 9/5/42 [*], J.H.F., 28/3/48 [*] . WD/C
236. *Bembidion harpaloides* Svll. J.H.F., 25/3/48 [*] L
244. *B. aeneum* Germ. A.S., 5/31 [*] . . . . . WD
247. *B. transparens* Goeb. R.W., 9/5/42 [*], A.S., 19/4/42 [*] . . . VL
250. *B. doris* (Pnz.). M.L.T., 24/6/22 [†, A], W.D.H. and J.F., 3/43 [A], W.D.H. [*], 16/5/42, 1/8/42, 27/6/42 . . . . . WD/C
255. *B. lampros* (Hbst.). R.W., 16/5/42 [*], A.S., 25/3/45 [*], J.H.F., 25/3/48 [*] . . . . . WD/C
268. *B. 4-maculatum* (L.). A.S. 19/4/42 [*] L
276. *B. ustulatum* (L.). W.J.S., etc., 16/6/45 [A] . . . . . WD
324. *Dromius linearis* (Olvr.). W.D.H., 1/8/42 [A] . . . . . WD
333. *D. sigma* (Rossi). A.W., 1830 [E], W.J.S., etc., 16/6/45 [A], W.D.H. [*], 22/9/45, 15/6/46 . . . . . L/C
345. *Haliplus obliquus* (F.). G.B.W., 1930 [A], W.W.F. (1881) [†, B], H.H., 1871 [B] . . . . . WD
346. *H. confinis* Steph. E.J.P., 11/6/37 [A] . . . . . R
349. *H. flavicollis* Sturm. G.B.W., 1930 [A], E.C.B., 1908 [A], H.H., 1871 [B] WD
352. *H. laminatus* (Schlr.). G.B.W. (1907) [C], W.H. (1885) [H] . . . L
353. *H. ruficollis* (DGr.). W.W.F. (1881) [†, B], W.J.F., 1910 [F], E.J.P., 11/6/37 [A], W.D.H., 10/7/42 [A] . . . . . WD
358. *H. immaculatus* Ght. E.J.P., 11/7/37 [A] . . . . . WD
359. *H. lineolatus* Mann. E.J.P., 11/7/37 [A] L
360. *H. lineatocollis* Marsh. E.J.P., 11/7/37 [A] L
364. *Noterus clavicornis* (DGr.). W.W.F. (1881) [†, B], T.H.B., 1902 [B], A.W., 11/1830 [H], W.J.F., 1910 [F], G.B.W., 1918 [A], W.D.H. 4/25 [A] L
365. *Laccophilus hyalinus* (DGr.). W.C.H. (1907) [C] VL
366. *L. minutus* (L.). W.W.F. (1881) [†, B], W.C.H. (1885) [H] . . . WD
371. *Bidessus geminus* (F.). W.C.H., 1898 [F] . . . . . R

372. ***Hyphydrus ovatus*** (L.). W.W.F. (1881) [†, B], G.B.W., 1911 [A], W.D.H., 16/5/42 [A], W.C.H. (1885) [H] . . . . . WD
373. ***Hygrotus versicolor*** (Schl.). A.B., 1887 [J] L
374. ***H. 5-lineatus*** (Ztd.). A.B., 1887 [J] L
375. ***H. inaequalis*** (F.). A.B., 1887 [J], W.W.F. (1881) [†, B], W.J.F., 1910 [F], W.D.H., 16/5/42 [A], W.C.H. (1885) [H] . . . . . WD
376. ***H. decoratus*** (Gyll.). A.W. (1831) [E], W.H., 4/11/1856 [F], H.H., 1871 [B], W.C.H., 1880 [D], A.B., 1887 [J], W.W.F. (1881) [†, B], T.H.B., 1903 [B], E.C.B., 14/6/08 [A], W.D.H., 13/6/31 [A], J. D. J. Preston, 1835 [H] L
380. ***H. impressopunctatus*** (Schlr.). W.H., 1856 [G], W.D.H., 16/5/42 [A] VL
381. ***Deronectes latus*** (Steph.). E.G.B. (1907) [C] L
382. ***D. assimilis*** (Pkl.). A.B., 1887 [J] . . . . . WD
390. ***Oreodytes halensis*** (F.). W.D.H., 16/5/42 [A] . . . . . AB
391. ***Hydroporus pictus*** (F.). A.B., 1887 [B] . . . . . WD
392. ***H. granularis*** (L.). H.H., 1872 [B], W.H., 1856 [†, G], W.W.F. (1881) [†, B], A.B., 1887 [J], W.C.H. (1894) [D], W.D.H., 16/5/42 [A] VL
395. ***H. lepidus*** (Olvr.). A.B., 1887 [J] L
396. ***H. lineatus*** (F.). W.W.F. (1881) [B], W.J.F., 1911 [F] . . . . WD
397. ***H. dorsalis*** (F.). H.H., 1872 [B], W.W.F. (1881) [†, B], A.B., 1887 [J], W.C.H. (1885) [H], T.H.B., 1902, 1907 [B], G.B.W., 1926 [A], W.D.H., 16/5/42 [A] . . . . . WD
398. ***H. scalesianus*** Steph. W.H., 1856 [G], H.H., 1871 [B], W.W.F. (1881) [†, B], W.C.H., 1886 [D], A.B., 1887 [J] . . . . . R
399. ***H. neglectus*** Schf. H.H., 1873 [B], W.C.H., 1882 [D] . . . VL
400. ***H. tristis*** (Pkl.). W.H., 1856 [G], H.H., 1872 [B], W.W.F. (1881) [†, B], W.C.H. (1894) [D], A.B., 1887 [J], W.J.F., 1910 [F], G.B.W., 1911 [A] WD
401. ***H. umbrosus*** (Gyll.). W.H., 1856 [G], H.H., 1871 [B], W.C.H. (1894) [D], T.H.B., 1902, 1905 [B], G.B.W., 1930 [A] L
402. ***H. angustatus*** Steph. W.H., 1856 [G], 1868 [F], H.H., 1871 [B], W.W.F. (1881) [†, B], G.B.W., 1930 [A] L
403. ***H. gyllenhalii*** Schiod. W.H., 1857 [G], H.H., 1872 [B] . . . VL
404. ***H. morio*** Aube. H.H., 1871 [B], W.W.F. (1881) [†, B], W.C.H. 1894) [D], G.B.W., 1926, 1930 [A] . . . . . WD
405. ***H. striola*** (Gyll.). H.H., 1871 [B], W.W.F. (1881) [†, B], W.C.H. (1894) [D], T.H.B., 1905, 1907 [B], E.C.B., 1908 [A], G.B.W., 1930 [A], W.D.H., 16/5/42 [A] VL
406. ***H. palustris*** (L.). W.W.F. (1881) [†, B], T.H.B., 1905, 1910 [B], W.J.F., 1910 [F], G.B.W., 1915 [A] . . . . . WD
407. ***H. incognitus*** Sharp. G.B.W., 1910 [A] VL
408. ***H. erythrocephalus*** (L.). W.W.F. (1881) [†, B], T.H.B., 1905, 1910 [B], W.J.F., 1910 [F], G.B.W., 1915 [A] . . . . . WD
409. ***H. rufifrons*** (Mll.). W.H., 1856 [G], H.H., 1872 [B], W.W.F. (1881) [†, B], T.H.B., 1905, 1910, 1924 [B], W.C.H. (1894) [D], G.B.W., 1926, 1930 [A], W.D.H., 20/3/42 [A] L
410. ***H. longulus*** Mll. E.C.B., 1908 [A] . . . . . R
412. ***H. melanarius*** Steph. H.H., 1871 [B], W.C.H. (1894) [D] . . . WD
413. ***H. memnonius*** Ncl. H.H., 1871 [B], W.H., 1856 [G], A.B., 1887 [J], T.H.B., 1902 [B], W.C.H. (1894) [D], G.B.W., 1930 [A] . . . L
414. ***H. obscurus*** Steph. W.H., 1856 [G], H.H., 1871 [B], W.W.F. (1881) [†, B], A.B., 1887 [J] . . . . . WD
415. ***H. nigrita*** (F.). W.W.F. (1881) [†, B], G.B.W., 1930 [A] . . . VL
417. ***H. pubescens*** (Gyll.). W.W.F. (1881) [†, B], W.J.F., 1910 [F] . . WD
418. ***H. planus*** (F.). W.W.F. (1881) [†, B], T.H.B., 1905, 1924 [B], W.J.F., 1910 [F], G.B.W., 1911 [A], W.M.C., 1936 [A], W.D.H., 28/3/42 [A] WD
419. ***H. tessellatus*** Dupon. H.H., 1871 [B], W.W.F. (1881) [†, B], A.B., 1887 [J] . . . . . WD
423. ***Laccornis oblongus*** (Steph.). W.H., 1856 [G], W.C.H., 1880 [D], W.W.F., (1881) [†, B], H.H. (1885) [H], A.B., 1887 [J], T.H.B., 1902 [†, B], E.C.B., 1909 [A], G.B.W., 1930 [A] VL
426. ***Agabus paludosus*** (F.). H.H., 1871 [B] VL
428. ***A. uliginosus*** (L.). W.H., 1856 [G], W.C.H. (1894) [†, B], W.W.F. (1881) [†, B], A.B., 1887 [J], T.H.B., 1902, 1905, 1910, 1924 [B], W.J.F., 1910 [F] VL

430. *Agabus unguicularis* Thm. W.W.F. (1881) [†, B], A.B., 1887 [J], W.C.H. (1894) [D], T.H.B., 1902 [†], 1910 [B], W.D.H., 1942 [A] . . L
431. *A. didymus* (Olvr.). H.H., 1871 [B] L
432. *A. congener* (Tbg.). H.H., 1871 [B] (doubted by W.C.H. [H]) . . R
433. *A. nebulosus* (Forst.). H.K.D., 19/4/05 [B] . . . . . WD
436. *A. labiatus* (Brahm.). H.H., 1871 [B] VL
437. *A. undulatus* (Srk.). W.H., 1856 [G], W.C.H., 1880 [D], W.W.F. (1881) [†, B], A.B., 1887 [J], T.H.B., 1902, 1910, 1924 [†, B], W.J.F., 1912 [F], A.W., 1830 [E], G.B.W., 1930 [†, A], W.D.H., 28/3/42, 4/35 [A], E.C.B., 1909 [A] VL
439. *A. sturmii* (Gyll.). W.W.F. (1881) [†, B], T.H.B., 1902 [B], W.D.H., 16/5/43 [A] . . . . . WD
440. *A. chalconotus* (Pnz.). W.W.F. (1881) [†, B], T.H.B., 1902, 1905, 1924 [B], G.B.W., 1911 [A] . . . . . WD
442. *A. bipustulatus* (L.). W.W.F. (1881) [†, B], T.H.B., 1902 [B], W.J.F., 1925 [F], W.J.S., etc., 16/6/45 [A], W.D.H., 26/4/42 [A]. . . WD
444. *Ilybius fuliginosus* (F.). W.W.F. (1881) [†, B], W.M.C., 1936 [A], W.J.S., etc., 16/6/45 [A] . . . . . WD
447. *I. ater* (DGr.). W.H., 1856 [G], W.W.F. (1881) [†, B], W.J.S., etc., 16/6/45 [A], W.C.H. (1885) [H] . . . . . WD
448. *I. 4-guttatus* (LCt.). W.H., 1856 [G], W.W.F. (1881) [†, B], G.B.W., 1930 [A], W.M.C., 1936 [A], W.J.S., etc., 16/6/45 [A] . . . L
449. *I. guttiger* (Gyll.). W.H., 1856 [G], 1868 [F], W.W.F. (1881) [†, B], W.C.H. (1907) [C], T.H.B., 1902 [†, B], E.C.B., 1908 [A], G.B.W., 1930 [A] L
450. *I. aenescens* Thm. E.C.B., 24/6/08 [A] L
451. *Copelatus haemorrhoidalis* (F.). A.W., 1830 [E], W.H., 1856 [G], 1868 [F], H.H., 1872 [B], W.W.F. (1881) [†, B], W.C.H., 1887 [D], T.H.B., 1902, 1905, 1910 [B], G.B.W., 1915 [A] L
452. *Rantus grapii* (Gyll.). H.H., 1872 [B], W.H., 1856 [G], 1868 [F], W.C.H., 1880 [D], A.B., 1887 [J], W.W.F. (1881) [†, B], T.H.B., 1902, 1910 [B], W.J.F., 1925 [F], G.B.W., 1930 [A] VL
453. *R. exsoletus* (Forst.). A.W., 1830 [E], H.H., 1872 [B], W.W.F. (1881) [†, B], T.H.B., 1902 [B], W.C.H. (1894) [D], G.B.W., 1930 [A], W.D.H., 4/25 [A] L
454. *R. pulverosus* (Steph.). A.W., 1830 [E] (? by W.C.H. [H]) . . VL
456. *R. bistriatus* (Berg.). H.H., 1872 [B] (doubted by W.C.H. [H]) . . R
458. *Colymbetes fuscus* (L.). W.W.F. (1881) [†, B], G.B.W., 1930 [A], W.J.S., etc., 16/6/45 [A], W.D.H., 1925, 3/43, 17/6/45 [A] . . WD
459. *Dytiscus semisulcatus* Mll. H.H., 1871 [B], G.B.W., 1917 [A], M.D.B., 1939 [A] . . . . . WD
460. *D. marginalis* L. W.W.F. (1881) [†, B], W.D.H., 3/42 [A], W.H. (1885) [H] . . . . . WD
462. *D. circumcinctus* Ahrens. W.W.F. (1881) [†, B], W.C.H. (1894) [D], H.K.D., 1905 [B] . . . . . R
464. *D. dimidiatus* Berg. W.C.H., 11/3/1882 [H], T.H.B., 1906 [B], H.K.D., 1905 [B], M.D.B., 1939 [A], W.D.H., 3/43 [A], A.W., 1830 [E] . VR
465. *Hydaticus transversalis* (Pont.). W.H., 1856 [G], H.H., 1872 [B], W.W.F. (1881) [†, B], A.W., 1830 [E], T.H.B., 1902 [B], W.C.H., 13/5/1885 [H], G.B.W., 1930 [†, B] . . . . . VR
466. *H. seminiger* (DGr.). W.C.H. (1907) [? C], A.W., 1830 [E] . . AB
467. *Acilius sulcatus* (L.). W.D.H., 1880 [F] . . . . . WD
478. *Gyrinus marinus* Gyll. W.C.H., 1882 [C] L
483. *Hydrochara caraboides* (L.). A.W. and R.C., 1830 [E] . . . VR
484. *Hydrobius fuscipes* (L.). W.W.F. (1881) [†, B], W.J.F., 1910 [F], W.M.C., 1936 [A], W.J.S., etc., 16/6/45 [A], W.D.H., 28/2/42 [A] WD
486. *Enochrus melanocephalus* (F.). W.H. (1907) [C] L
487. *E. testaceus* (F.). W.W.F. (1881) [†, B], W.C.H. (1907) [C] . . VL
489. *E. ochropterus* (Mann.). W.W.F. (1881) [†, B], H.K.D., 1905 [B], W.D.H., 4/25 [A], W.C.H. (1885) [H] L
492. *E. affinis* (Tbg.). F. B. Browne, 1908 [F] . . . . . VR
494. *E. coarctatus* (Gred.). W.W.F. (1881) [†, B], H.K.D., 1905 [B], W.J.F., 1910 [F], W.D.H. 10/5/42 [A], W.C.H. (1885) [H] . . . L

495. *Cymbiodyta marginella* (F.). W.W.F. (1881) [†, B], G.B.W., 1928 [A], W.C.H. (1885) [H] L
498. *Anacaena globulus* (Pkll.). W.J.F., 1910 [F] L
499. *A. limbata* (F.). W.W.F. (1881) [B], W.J.F., 1910 [F], G.B.W., 1916 [A], M.L.T., 24/6/22 [†, B], W.D.H., 28/3/42 [A] . . . . . WD
501. *Helochares lividus* (Forst.). W.W.F. (1881) [†, B], W.C.H. (1907) [C], W.H. (1885) [H] VL
503. *Laccobius sinuatus* Mors. W.C.H. (1885) [H] L
504. *L. striatulus* (F.). W.C.H. (1907) [C] . . . . . WD
506. *L. minutus* (L.). W.W.F. (1881) [†, B] L
507. *L. biguttatus* Gdt. W.C.H. (1907) [C] L
512. *Berosus signaticollis* Charp. H.H., 1872 [B] . . . . . R
514. *B. affinis* Brullé. G.B.W., 1918 [A] VL
515. *Limnebius truncatellus* (Tbg.). W.W.F. (1881) [†, B] . . . . . WD
518. *L. aluta* Bedel. W.W.F. (1881) [†, B], W.C.H., 1880 [D] L
519. *Chaetarthria seminulum* (Hbst.). W.W.F. (1881) [†, B], W.C.H. (1885) [H] L
520. *Spercheus emarginatus* (Slr.). J.P., 1834 [F] . . . . . AB
525. *Helophorus aquaticus* (L.). W.W.F. (1881) [†, B], W.J.F., 1910 [F], W.J.S., etc., 16/6/45 [A], A.S., 8/5/48 [*] . . . . . WD
526. *H. aqualis* Thmn. H.K.D., 1905 [B], W.J.F., 1925 [A] . . . . WD
533. *H. flavipes* F. W.W.F. (1881) [†, B], W.J.F., 1925 [A] L
536. *H. minutus* F. W.W.F. (1881) [†, B], W.D.H., 5/42 [A] . . . R
538. *H. granularis* (L.). W.W.F. (1881) [†, B] L
540. *H. brevipalpis* Bedel. W.D.H., 1/8/42 [*] (det. F. Balfour-Browne) . WD
541. *H. arvernicus* Muls. W.D.H., 4/25 [A] L
544. *Hydrochus elongatus* (Slr.). W.W.F. (1881) [†, B], G.B.W., 1926 [A] . L
546. *H. angustatus* Gmr. W.J.F., 1911 [F] VL
555. *Ochthebius minimus* (F.). W.W.F. (1881) [†, B], H.K.D., 1905 [B], E.C.B., 1908 [A], W.C.H. (1885) [H], G.B.W., 1926 [A], W.D.H., 1925, 1942 [A] . . . . . WD
562. *Hydraena testacea* Curtis. W.C.H. (1907) [C] L
563. *H. palustris* Erch. W.W.F. (1881) [†, B], W.C.H. (1894) [D], W.H., 1866 [F], T.H.B., 1902 [B] . . . . . R
564. *H. riparia* Kug. W.W.F. (1881) [†, B], E.C.B., 1908 [A], G.B.W., 1930 [A], W.D.H., 2/45 [*] . . . . . WD
566. *H. nigrita* Gmr. W.D.H., 4/25 [A] . . . . . R
568. *H. gracilis* Gmr. W.H., 1856 [G] . . . . . WD
572. *Coelostoma orbiculare* (F.). W.W.F. (1881) [B], H.H., 1872 [B], W.C.H. (1885) [H] . . . . . WD
575. *Sphaeridium lunatum* F. R.W., 9/5/42 [*] . . . . . WD
578. *Cercyon ustulatus* (Prey.). W.D.H., 3/43 [A] VL
591. *C. analis* (Pkll.). W.D.H., 3/43 [A] . . . . . WD
635. *Oxypoda opaca* (Gerst.). W.D.H., 3/43 [A] . . . . . L/C
648. *O. longiuscula* (Gerst.). W.D.H., 3/43 [A] . . . . . WD
687. *Calodera aethiops* (Gerst.). W.E.S. (n.d.) [A] . . . . . VR
689. *C. riparia* Erch. W.E.S. (n.d.) [A] . . . . . VR
730. *Atheta gregaria* (Erch.). W.J.F., 1925 [A] . . . . . WD
769. *A. angustula* (Gyll.). J.P., 1834 [F] L
772. *A. nigella* (Erch.). G.B.W., 5/29 [A], W.D.H., 24/4/43, 23/5/43 [A] . L/C
842. *A. graminicola* (Gerst.). M.L.T., 13/6/31 [A], W.D.H., 3/43 [A] . . WD/C
861. *A. zosterae* (Thmn.). W.D.H., 3/43 [A] . . . . . WD/C
873. *A. fungi* (Gerst.). W.D.H., 24/4/43 [A] . . . . . WD
885. *Amischa analis* (Gerst.). W.D.H., 24/4/43 [A] . . . . . WD/C
890. *Alianta incana* (Erch.). M.L.T., 4/6/1900 [C], W.D.H., 3/43, 24/4/43 [A] VL
893. *Sipalia circellaris* (Gerst.). W.D.H., 19/2/44 [*] . . . . . WD
902. *Tachyusa atra* (Gerst.). G.B.W., 1931 [A] L
956. *Hygronoma dimidiata* (Gerst.). J.P., 1835 [F], R.S.B., 1/46 [*], W.D.H., 1/8/42, 1/6/46 [*] VL
966. *Myllaena dubia* (Gerst.). M.L.T., 24/6/22 [A, †], W.D.H., 3/43 [A]. . AB
968. *M. minuta* Gerst. W.D.H., 3/43, 17/6/45 [A], W.J.S., etc., 16/6/45 [A] AB/C
977. *M. brevicornis* (Mlst.). W.H. and W.C.H. (1907) [C] L
978. *Gymnusa brevicollis* (Pkll.). W.W.F. (1881) [B], W.H., 1855 [G] . . VL

990. ***Conosomus pedicularius*** (Gerst.). W.E.S., 1913 (A), W.J.F., 1914 [F], W.D.H., 22/9/45 [*] . . . . . VL/C
993. ***Tachyporus obtusus*** (L.). W.D.H., 23/5/43 [B], J.H.F., 23/5/48 [*] . WD/VC
1003. ***T. pusillus*** Gerst. W.D.H., 16/5/42 [*] . . . . . WD
1067. ***Quedius cruentus*** (Olvr.). W.D.H., 15/7/44 [*] . . . . . WD
1080. ***Q. maurorufus*** (Gerst.). W.C.H. (n.d.) [F] . . . . . WD
1119. ***Philonthus succicola*** Thmn. W.J.S., 1945 [A] L
1125. ***P. fuscipennis*** (Mann.). J.H.F., 25/3/48 [*], W.D.H., 16/5/42 [*] . . WD
1127. ***P. varius*** (Gyll.). W.D.H. [*], 1/8/42, 24/7/43, J.H.F., 25/9/48 [*] . WD/C
1149. ***P. varians*** (Pkll.). W.D.H., 16/5/43 [*] . . . . . WD
1150. ***P. ventralis*** (Gerst.). M.L.T., 20/6/25 [A] L
1152. ***P. quisquiliarius*** (Gyll.). W.D.H. [*], 23/5/43, 24/7/43 L
1155. ***P. fumarius*** (Gerst.). M.L.T., 24/6/22 [†, B], W.O.S., 13/5/43 [A], W.D.H., 23/5/43 [A] VL
1156. ***P. micans*** (Gerst.). M.L.T., 20/6/25 [A] VL
1160. ***P. puella*** Nrd. W.D.H., 16/5/43 [*] . . . . . WD
1165. ***Gabrus trossulus*** (Nrd.). G.B.W. (n.d.) [A] . . . . . WD
1203. ***Lathrobium elongatum*** (L.). W.D.H., 3/43 [A] . . . . . WD/C
1204. ***L. geminum*** Krtz. M.L.T., 24/6/22 [†, A] L
1215. ***L. quadratum*** (Pkll.). M.L.T., 24/6/22 [†, A] L
1216. ***L. terminatum*** Gerst. W.C.H. (1907) [C], M.L.T., 24/6/22 [†, A]. . L
1227. ***Rugilus erichsoni*** (Fauv.). W.C.H. (1907) [C] L
1230. ***R. orbiculatus*** (Pkll.). W.C.H. (1907) [C] L
1253. ***Paederus litoralis*** Gerst. W.C.H. (1907) [C] L
1254. ***P. riparius*** (L.). R.C. (1878) [F], W.C.H., M.L.T. and E.C.B. (1907) [C]. VL
1257. ***Euaesthetus bipunctatus*** (Lj.). J.H.F., 28/3/48 [*] L
1258. ***E. ruficapillus*** B. & L. W.D.H., 16/5/42 [*] L
1263. ***Stenus comma*** LCt. W.C.H., 1894 [H] . . . . . R
1266. ***S. juno*** F. W.C.H. (1894) [F], W.D.H., 3/43 [A] . . . . . WD/C
1308. ***S. pubescens*** Steph. W.O.S., 3/43 [A] . . . . . WD/C
1311. ***S. pallitarsis*** Steph. E.C.B. (1907) [C], W.J.S., etc., 16/6/45 [A], W.D.H., 24/7/43, 1/8/42 [*] VL
1313. ***S. bifoveolatus*** Gyll. W.C.H., 1894 [D], W.J.F., 1925 [F] . . . . WD
1320. ***S. similis*** (Hbst.). W.J.S., etc., 16/6/45 [A] . . . . . WD
1322. ***S. tarsalis*** Ljungh. W.J.F., 1925 [F], W.D.H., 16/5/42 [*] . . . WD
1323. ***S. fulvicornis*** Steph. W.C.H. (1907) [C] VL
1324. ***S. latifrons*** Erch. M.L.T., 24/6/22 [†, B], G.B.W, 1930 [A] . . . L
1326. ***Oxyporus rufus*** (L.). R.C. (1878) [F] L
1361. ***O. laqueatus*** (Marsh.). W.D.H., 20/5/42 [A], W.J.S., etc., 16/6/45 [A] . WD
1379. ***Trogophloeus elongatulus*** Erch. G.B.W., 1925 [A] L
1383. ***T. corticinus*** (Gerst.). G.B.W., 1925 [A], W.D.H., 3/43, 24/4/43 [A] . L
1398. ***Syntomium aeneum*** (Mll.). W.D.H., 1/8/42 [A] L
1417. ***Olophrum piceum*** (Gyll.). W.C.H. (1894) [D] . . . . . WD
1467. ***Eusphalerum torquatum*** (Marsh.). W.J.S., 1945 [A], A.S., 4/31 [*], J.H.F., 25/4/48 [*] . . . . . WD/C
1468. ***E. sorbi*** Gyll. W.J.S., etc., 16/6/45 [A] . . . . . WD
1479. ***Metopsia clypeata*** (Mll.). W.J.F., 1914 [F] VL
1480. ***Phloeocharis subtilissima*** Mann. W.D.H. [*], 7/4/45, 17/5/46 . . . L
1502. ***Anistoma humeralis*** (F.). W.D.H. [*], 24/4/43, 15/6/46 . . . WD
1540. ***Necrophorus humator*** Goeze. R.W., 9/5/42 [A] . . . . . WD
1553. ***Thanatophilus rugosus*** (L.). R.W., 5/42 [A], H.B., 1944 [A], A.S., 24/7/48 [*] . . . . . WD
1556. ***Oeceoptoma thoracicum*** (L.). W.D.H., 4/43 [A] . . . . . WD
1558. ***Phosphuga atrata*** (L.). R.W., 5/42 [A] . . . . . WD
1576. ***Catops morio*** (F.). W.D.H., 3/43 [A] VL
1633. ***Pselaphus heisei*** Hbst. E.J.P. (1947) [A] VL
1634. ***P. dresdensis*** Hbst. W.H., 1856 [G], E. Rye, 1872 [B], W.W.F. (1881) [B], W.C.H., 1888 [F], E.J.P. (1947) [A] . . . . . AB
1635. ***Tychus niger*** (Pkll.). E.J.P. (1947) [A] . . . . . WD
1636. ***Bryaxis puncticollis*** Den. W.C.H. (1907) [C], E.J.P. (1947) [A] . . L
1637. ***B. bulbifera*** (Rb.). E.J.P. (1947) [A] . . . . . WD
1640. ***B. burrellii*** (Den.). E.J.P. (1947) [A] VL
1646. ***Brachygluta fossulata*** (Rbach.). E.J.P. (1947) [A] . . . . . WD

1651. *Reichenbachia impressa* (Pnz.). W.C.H. (1907) [C], E.J.P. (1947) [A] . VL
1659. *Bibloplectus pussilus* Den. E.J.P. (1947) [A] . . . . . AB
1685. *Agrotrichis grandicollis* (Mann.). W.D.H., 3/43, 24/4/43 [A]. . . L/C
1751. *Olibrus aeneus* (F.). W.D.H. [*], 1/8/43, 3/43, 15/7/44 . . . L
1764. *Anisosticta 19-punctata* (L.). G.B.W., 1918 [A], M.L.T., 20/6/25 [A], W.D.H., 24/3/43, 12/7/43 [A], 1/8/45 [*], 27/7/46 [*], J.H.F., 25/4/48 [*] . . . . . L/C
1767. *Adalia bipunctata* (L.). J.M.B., 1922 [A], W.J.S., etc., 16/6/45 [A], A.S., 12/7/44 [*] . . . . . WD
1768. *A. 10-punctata* (L.). W.D.H., 24/7/43 [A], W.J.S., etc., 16/6/45 [A], A.S., 16/7/44 [*] . . . . . WD
1781. *Myrrha 18-guttata* (L.). A.S., 9/5/46 [*] L
1782. *Thea 22-punctata* (L.). J.H.F., 16/4/48 [*] L
1785. *Scymnus testaceus* Mots. W.D.H., 24/4/43 [*] L
1786. *S. suturalis* Tbg. A.S., 8/5/46 [*] L
1799. *Chilocorus renipustulatus* (Scrib.). W.D.H., 6/25 [A] L
1803. *Coccidula rufa* (Hbst.). J.M.B., 6/22 [A], W.D.H. [*], 26/5/42, 27/5/44 WD
1810. *Endomychus coccineus* (L.). W.D.H., 22/9/45 [*] L
1828. *Synchita humeralis* (F.). W.D.H., 1/6/46 [B] . . . . . AB
1832. *Cerylon histeroides* (F.). W.D.H., 15/7/44 [*] L
1845. *Hister carbonarius* Hoff. M.L.T., 13/6/31 [A] L
1862. *Saprinus semistriatus* (Scrib.). W.M.C., 1936 [A] . . . . WD
1891. *Carpophilus sexpustulatus* (F.). M.D.B., 1941 [A] . . . . VR
1907. *Epurea unicolor* (Olvr.). G.B.W., 1930 [A] L
1917. *Nitidula rufipes* (L.). W.D.H., 24/4/44 [A] . . . . . VR
1927. *Laria dulcamarae* Scop. W.D.H., 1/6/46 [*] . . . . . VL/C
1934. *Melegethes aeneus* (F.). W.D.H., 23/3/46 [*] (det. A. M. Easton) . WD
1935. *M. viridescens* (F.). W.D.H., 17/5/46 [*] (det. A. M. Easton) . . WD
1945. *M. lumbaris* Sturm. W.D.H., 17/5/46 [*] (det. A. M. Easton) . . AB
1967. *Librodor hortensis* (Gfroy.). W.D.H., 1942 [A], A.S., 8/5/48 [*] . . R
1977. *Rhizophagus bipustulatus* (F.). R.W., 30/12/43 [A] . . . . L/C
2029. *Corticarina fuscula* (Gyll.). W.D.H., 13/6/31 [A] . . . . WD
2061. *Telmatophilus caricis* (Olvr.). A.E.W., 1919 [A] L
2063. *T. typhae* (Fn.). M.L.T. (1907) [C], W.D.H., 3/43 [A] . . . . L/C
2066. *Antherophagus pallens* (Fallen.). M.L.T., 20/6/25 [A] L
2126. *Atomaria nitidula* Har. W.D.H., 3/43 [A] L
2128. *A. mesomela* Hbst. M.L.T. (1907) [C] L
2135. *Ephistemus globulus* (Pkll.). W.D.H., 13/6/31 [A] . . . . R
2137. *Scaphidium 4-maculatum* Olvr. W.C.H. (1907) [C] L
2144. *Litargus connexus* (Gfroy.). W.D.H., 27/5/47 [A] . . . . R
2162. *Megatoma undata* (L.). E.G.B. (1907) [C], W.D.H., 15/10/46 [*] (reared) VL
2204. *Heterocerus flexuosus* Steph. H.H., 1872 [B] VL
2227. *Aphodius oestivalis* Steph. J.W., 1931 [A] L
2228. *A. fimetarius* (L.). A.S., 7/38 [*] . . . . . WD
2255. *A. sphacelatus* (Pnz.). A.S., 27/5/45 [*] . . . . . WD
2256. *A. prodromus* (Brahm.). J.H.F., 25/9/48 [*] . . . . . WD
2258. *A. obliteratus* Pnz. R.W., 5/1/42 [*] VL
2313. *Trixagus dermestoides* (L.). W.D.H., 13/6/31 [A] L
2317. *Melasis buprestoides* (L.). M.D.B., 16/5/42 [A], C.L., 1945 [A], W.D.H., 15/6/46 [A] . . . . . R
2358. *Limonius minutus* (L.). W.D.H., 1935 [A] VL
2368. *Agriotes pallidulus* (Illg.). W.J.S., etc., 16/6/45 [A] . . . . WD
2371. *Corymbites pectinicornis* (L.). W.D.H., 27/5/44 [*] . . . . WD
2372. *C. cupreus* (F.). W.J.S., etc., 16/6/45 [A] . . . . . WD
2373. *C. sjaelandicus* (Mell.). E.G.B. (1907) [C] VL
2377. *C. impressus* (F.). A.S., 23/7/44 [*] L
2380. *Denticollis linearis* (L.). J.M.B., 1922 (A), W.D.H., 27/5/44 [*], A.S., 27/5/45 [*] . . . . . WD/C
2382. *Helodes minuta* (L.). W.J.S., etc., 16/6/45 [A] . . . . . WD
2384. *Microcara testacea* (L.). J.D.F., 6/17 [A], A.S., 12/7/44 [*] . . . WD
2387. *Cyphon paykulli* Guerin. W.J.S., etc., 16/6/45 [A] L
2388. *C. variabilis* (Tbg.). W.D.H., 3/43 [A] . . . . . WD/C
2390. *C. ochraceus* Steph. W.J.S., etc., 16/6/45 [A] L

2391. ***Cyphon padi*** (L.). M.L.T., 20/6/25 [A], W.H. (1907) [C] . . . VL
2394. ***Scirtes hemisphaericus*** (L.). W.C.H. (1907) [C], W.J.F., 1918 [F] . VL
2406. ***Cantharis rustica*** Fall. W.J.S., etc., 16/6/45 [A] . . . . . WD
2407. ***C. livida*** L. J.M.B., 1922 [A], W.J.S., etc., 16/6/45 [A], A.S., 4/31 [*], W.D.H., 27/5/47 [*] . . . . . WD
2409. ***C. nigricans*** (Mell.). W.J.S., etc., 16/6/45 [A] . . . . . WD
2411. ***C. rufa*** L. J.M.B., 1922 [A], W.J.S., etc., 16/6/45 [A] . . . L
2414. ***C. pallida*** Goeze. W.D.H., 1/8/42 [A], W.J.S., etc., 16/6/45 [A] . . WD
2416. ***C. paludosa*** Fall. J.M.B., 6/22 [A] L
2417. ***C. fulvicollis*** F. W.J.S., etc., 16/6/45 [A] . . . . . WD
2418. ***C. thoracica*** (Olvr.). W.C.H. (1907) [C], G.B.W., 1918 [A], W.D.H., 1/8/42 [A]. VL
2422. ***Rhagonycha fulva*** (Scop.). J.H.F., 25/8/48 [*] . . . . . WD
2423. ***R. testacea*** (L.). M.L.T., 1922 [A], G.B.W., 1922 [A], W.D.H., 27/5/47 [*], J.H.F., 30/5/48 [*] . . . . . VL/C
2424. ***R. limbata*** Thmn. W.J.S., etc., 16/6/45 [A] . . . . . WD
2431. ***Malthodes marginatus*** (Ltr.). W.J.S., etc., 16/6/45 [A], A.S., 25/7/45 [*] WD
2444. ***Malachius bipustulatus*** (L.). W.J.S., etc., 16/6/45 [A], A.S., 4/31 [*], J.H.F., 16/5/48 [*] L
2456. ***Dasytes aerosus*** Kies. W.D.H., 24/4/43 [A] VL
2470. ***Necrobia violacea*** (L.). W.J.S., etc., 16/6/45 [A] VL
2489. ***Hedobia imperialis*** (L.). J.M.B., 20/6/25 [A], M.L.T., 1926 [A] . . L
2498. ***Anobium striatum*** Olvr. A.S., 11/6/48 [*] . . . . . WD
2499. ***A. fulvicorne*** Steph. W.J.S., etc., 16/6/45 [A], C.L., 1946 [A] . . L
2528. ***Sphindus dubius*** (Gyll.). W.D.H., 1/6/46 [B] . . . . . R
2529. ***Cis boleti*** (Scop.). W.D.H., 5/10/46 [*] . . . . . WD
2533. ***C. bidentatus*** (Olvr.). W.D.H. (n.d.) [A] . . . . . L/C
2552. ***Aromia moschata*** (L.). G.B.W. and T.S. (1907) [C], J.W., 1932 [A], R.W., 1942 [A] VL
2562. ***Clytus arietis*** (L.). A.S., 4/31 [*] . . . . . WD
2564. ***Anaclyptus mysticus*** (L.). W.C.H. (1907) [C] . . . . . R
2572. ***Rhagium mordax*** (DGr.). W. C. Harton (1872) [F] L
2588. ***Strangalia maculata*** Pand. G.B.W. and W.J.F., 25/7/18 [A], W.J.S., etc., 16/6/45 [A] . . . . . WD
2593. ***Grammoptera ruficornis*** (F.). T.B.K., 6/22 [F] . . . . . WD
2599. ***Pogonocherus hispidulus*** (Piller.). C. D. Ash (1907) [C] L
2608. ***Saperda populnea*** (L.). M.L.T. (1907) [C], 1913 [A], 1922 [A], M. Stewart, 1926 [A] VL
2609. ***Tetrops praeusta*** (L.). W.C.H. (1907) [C], T.B.K., 6/22 [A], W.D.H., 23/5/43 [A] VL
2632. ***Donacia versicolorea*** (Brahm.). W.C.H. (1907) [C], W.D.H., 1931 [A] L
2634. ***D. aquatica*** (L.). W.D.H., 1931 [A], J.R.D., 13/6/31 [A] VL
2635. ***D. marginata*** Hoppe. W.W.F. (1885) [B], W.C.H. (1907) [C], J.R.D., 6/25, 13/6/31 [A], W.J.F., 6/25 [F], W.D.H. [*], 6/25, 24/7/43 . VL
2640. ***D. simplex*** F. J.R.D., 6/25 [A], T.S., 1944 [A], W.J.S., etc., 16/6/45 [A], W.D.H. [*], 3/6/31, 27/5/44, 31/7/43 . . . . . WD/C
2641. ***D. vulgaris*** Zsch. M.L.T., 13/6/31 [A], J.R.D., 13/6/31 [*], T.S., 1944 [A] VL/C
2645. ***Plateumaris sericea*** (L.). J.R.D., 6/25 [A], T.S., 1931 [A], W.J.S., etc., 16/6/45 [A], W.D.H. [*], 3/6/31, 21/5/34, 27/5/44 . . . . . L/C
2655. ***Lema lichenis*** Voet. W.J.F. and G.B. . (n.d.) [F], J.R.D., 1932 [F], J.H.F., 25/8/47 [*], W.D.H. [*], 17/5/46, 27/5/47, 19/2/44 . . . WD/C
2658. ***L. melanopa*** (L.). A.S. [*], 4/31, 9/5/48, W.D.H. [*], 1/8/42, 10/5/42, 15/7/44, 24/4/43 . . . . . WD/C
2677. ***Cryptocephalus fulvus*** Goeze. W.C.H. (1907) [C] VL
2678. ***C. pusillus*** F. W.D.H. [*], 24/7/43, 31/7/43 VL
2679. ***C. labiatus*** (L.). W.C.H. (n.d.) [F], W.J.S., etc., 16/6/45 [A], W.D.H. [*], 24/7/43, 15/7/44, 17/6/45 . . . . . WD
2690. ***Chrysolina staphylaea*** (L.). R.W., 9/41 [*], W.D.H., 27/5/44 [*] . . WD
2691. ***C. polita*** (L.). J.H.F., 25/8/48 [*] . . . . . WD
2709. ***Gastrophysa viridula*** (DGr.). W.J.S., etc., 16/6/45 [A] . . . L
2710. ***G. polygoni*** (L.). J.H.F. [*], 25/4/48, 30/5/48, 25/8/48 . . . . WD/C
2713. ***Phaedon armoraciae*** (L.). A.S., 8/5/48 [*], J.H.F., 25/4/48 [*] . . L
2714. ***P. cochleariae*** (F.). J.H.F., 28/3/48 [*] . . . . . WD

2716. ***Phyllodecta vulgatissima*** L. J.H.F., 30/5/48 [*] . . . . . WD
2718. ***P. vitellinae*** (L.). J.M.B., 6/22 [A], W.J.S., etc., 16/6/45 (A), J.H.F., 27/6/48 [*] . . . . . WD
2719. ***Hydrothassa aucta*** (F.). G.B.W., 1918 [A] L
2720. ***H. marginella*** (L.). A.S. and J.H.F., 25/4/48 [*] . . . . . WD/C
2723. ***Prasocuris phellandrii*** (L.). W.J.F., 4/10 [F], M.D.B., 1941 [A], A.S., 5/43 [*], W.D.H. [*], 1/8/42, 26/5/42, J.H.F., 25/4/48 [*] . . . WD/C
2724. ***Phyllobrotica 4-maculata*** (L.). G.B.W., 1918 [A], A.S., 9/40 [*] . . VL
2731. ***Galerucella viburni*** (PkII.). J.H.F., 25/9/48 [*] VL
2732. ***G. nymphaeae*** (L.). E.G.B. (1907) [C], J.M.B. and M.L.T., 1922 [A], G.B.W., 1918 [A], R.W., 8/42 [*], J.R.D., 13/6/31 [*], J.H.F., 9/5/48 [*], W.D.H. [*], 16/5/42, 1/8/42, 24/7/43 . . . . . VL/VC
2734. ***G. lineola*** (F.). M.L.T., 20/6/25 [A], W.D.H. [*], 24/7/43, 1/6/46, J.H.F. [*], 25/4/48, 16/5/48 . . . . . L/VC
2735. ***G. calmariensis*** (L.). G.B.W., 1918 [A], J.M.B. and T.B.K., 6/22 [A], W.J.S., etc., 16/6/45 [A], J.H.F., 30/5/48 [*], W.D.H. [*], 1/8/42, 24/7/43, 1/6/46 . . . . . L/VC
2736. ***G. tenella*** (L.). W.C.H. (1907) [C], W.J.S., etc., 16/6/45 [A], J.H.F., 16/4/48 [*], W.D.H. [*], 16/5/42, 1/8/42, 24/7/43 . . . . L/VC
2737. ***G. pusilla*** (Duft.). J. D. Firth, 6/17 [*] . . . . . R
2751. ***Longitarsus luridus*** (Scop.). J.H.F., 25/8/48 [*] . . . . . WD/C
2753. ***L. suturellus*** (Duft.). J.H.F. [*], 16/5/48, 25/4/48, 25/9/48 . . . WD/VC
2778. ***Haltica palustris*** Weise. A.S., 8/5/46 [*] VL
2779. ***H. oleracea*** (L.). G.B.W., 25/7/18 [A] L
2791. ***Phyllotreta undulata*** Küts. J.H.F., 25/8/48 [*] . . . . . WD
2800. ***Aphthona coerulea*** (Fourc.). W.J.F., 1910 [F], M.L.T. and J.M.B., 1922 [A], W.J.S., etc., 16/6/45 [A], R.W., 5/42 [*], J.H.F., 25/3/48 [*], A.S. [*], 25/3/45, 25/4/48 . . . . . L/VC
2802. ***A. cyanella*** Redt. J.H.F., 25/3/48 [*] (teste S. Maulik) . . . VL
2804. ***A. atrovirens*** (Fstr.). J.H.F., 25/3/48 [*] (teste S. Maulik) . . . AB
2409. ***Sphaeroderma testaceum*** (F.). J.H.F., 25/8/48 [*] . . . . WD
2816. ***Mantura rustica*** (L.). W.D.H., 13/6/31 [A] . . . . . WD
2828. ***Chalcoides plutus*** (Ltr.). J.H.F., 16/5/48 [*] . . . . . R
2829. ***Chalcoides aurata*** (Marsh.). J.M.B., 6/02 [F] . . . . . WD
2830. ***C. fulvicornis*** (F.). M.L.T., 13/6/31 [A] VL
2834. ***Chaetocnema concinna*** (Mann.). A.S., 8/5/46 [*], J.H.F. [*], 23/5/48, 25/8/48 . . . . . WD/C
2839. ***C. hortensis*** (Gfroy.). W.D.H., 13/6/31, 19/2/44 [A] VL
2844. ***Psylliodes affinis*** (PkII.). W.J.S., etc., 16/6/45 [A], T.B.K., 6/22 [A] . L
2864. ***Cassida flaveola*** Tbg. W.C.H. (1907) [C], W.J.F., 25/7/18 [A], W.D.H., 8/42 [A], W.J.S., etc., 16/6/45 [A], J.H.F., 25/8/48 [*] L
2925. ***Abdera flexuosa*** (PkII.). W.D.H., 24/4/43 [B] VL
2942. ***Vincenzellus viridipennis*** (Ltr.). W.D.H., 13/6/31 [A] . . . . WD
2977. ***Anaspis lurida*** Steph. E.G.B. (1907) [C] VL
3008. ***Platyrhinus resinosus*** (Scop.). T.B.K., 1945 [B] . . . . . AB
3028. ***Caenorhinus nanus*** (PkII.). W.J.S., etc., 16/6/45 [A], W.D.H. [*], 31/7/43, 27/5/44, 15/7/44, 17/6/45 . . . . . VL/C
3030. ***C. longiceps*** Thg. W.D.H., 17/6/45 [*], J.H.F., 27/6/48 [*] . . . WD/C
3036. ***Apion craccae*** (L.). W.D.H, 27/5/47 [*] . . . . . R
3067. ***A. dichroum*** Bedel. J.H.F. [*], 25/5/48, 16/4/48, 25/9/48 . . . WD/C
3068. ***A. nigritarse*** Kirby. M.L.T., 13/6/31 [A] L
3072. ***A. hookeri*** Kirby. M.D.B., 16/5/42 [A] VL
3096. ***A. vorax*** Hbst. J.H.F., 16/4/48 [*] L
3098. ***A. platalea*** Gmr. J.D.F., 6/17 [A] VL
3103. A. ***loti*** Kirby. M.L.T., 13/6/31 [A] L
3114. ***A. hydrolapathi*** (Mann.). W.J.S., etc., 16/6/45 [A], W.D.H., 17/6/45 [*], J.H.F., 16/5/48 [*] VL
3153. ***Strophosomus nebulosus*** Steph. W.D.H., 27/5/44 [*] L
3162. ***Brachysomus echinatus*** (Bons.). W.D.H., 13/6/31 [A] L
3164. ***Sciaphilus asperatus*** (Bons.). R.J.D., 13/6/31 [A] . . . . WD
3181. ***Phyllobius calcaratus*** (F.). W.J.S., etc., 16/6/45 [A] . . . . WD
3182. ***P. pomaceus*** Gyll. A.S., 9/5/48 [*] . . . . . WD
3183. ***P. pyri*** (L.). A.S., 9/5/48 [*] . . . . . WD

3187. *P. virideaeris* (LCt.). J.H.F. [*], 16/5/48, 30/5/48 . . . . WD/C
3188. *P. viridicollis* (F.). A.S., 9/5/48 [*] L
3211. *Sitona lineatus* (L.). A.S., 4/31 [*] . . . . . WD
3216. *Phytonomus austriacus* (Schfr.). W.D.H. [*], 1/8/42, 27/7/46 . . WD
3219. *P. rumicis* (L.). E.G.B. and C.W.R. (1907) [C] L
3220. *P. adspersus* (F.). J.M.B., 1932 [A] VL
3224. *P. suspiciosus* (Hbst.). M.D.B., 1941 [A] VL
3230. *P. nigrirostris* (F.). W.D.H., 31/7/43 [*] . . . . . WD
3248. *Hylobius abietis* (L.). T.B.K., 6/22 [A] . . . . . WD
3262. *Rhynchaenus rusci* (Hbst.). E.G.B. (1907) [C] L
3276. *Notaris scirpi* (F.). J.H.F., 18/5/48 [*] . . . . . AB
3278. *N. acridulus* (L.). J.H.F. [*], 28/3/48, 28/6/48, 23/8/48 . . . WD/VC
3279. *N. aethiops* (F.). J. Stephens (1827) [F] . . . . . VR
3288. *Dorytomus taeniatus* (F.). J.R.D., 13/6/31 [A] . . . . . WD
3291. *D. melanophthalmus* (Pkll.). W.J.S., etc., 16/6/45]A], W.D.H., 17/6/45 [*] L
3301. *Tanysphyrus lemnae* (Pkll.). W.W.F. (1881) [B], W.C.H. (1907) [C], W.D.H., 3/43, 27/5/44, 15/7/44, 1/6/46 [A] . . . . . L/C
3302. *Hydronomus alismatis* (Mann.). W.D.H., 13/6/31 [A] L
3303. *Ephimeropus petro* (Hbst.). W.W.F., 10/8/80 [B], W.C.H., 1895 [A] . AB
3308. *Bagous limosus* (Gyll.). W.W.F. (1881) [B] . . . . . R
3309. *B. tempestivus* (Hbst.). E.C.B. (1917) [F] VL
3354. *Gymnetron pascuorum* (Gyll.). M.L.T., 1900 [C] . . . . . R
3359. *Mecinus pyraster* (Hbst.). M.L.T., 1922 [A], J.H.F., 25/9/48 [*] . . WD
3374. *Nanophyes marmoratus* (Goeze). G.B.W., 7/17 [A], W.J.S., etc., 16/6/45 [A], W.D.H. [*], 24/7/43, 15/7/44 . . . . . L/C
3376. *Cionus scrophulariae* (L.). W.J.S., etc., 16/6/45 [A] . . . . . WD
3390. *Coeliodes rubicundus* (Hbst.). W.C.H. (1907) [C] VL
3395. *Cidnorhinus 4-maculatus* (L.). W.J.S., etc., 16/6/45 [A] . . . . WD
3403. *Ceuthorhynchus cochleariae* (Gyll.). J.H.F., 6/5/48 [*] . . . . . R
3406. *C. erysimi* (F.). J.H.F., 28/3/48 [*] . . . . . WD/C
3417. *C. pollinarius* (Fstr.). A.S., 4/31 [*] . . . . . WD
3437. *C. litura* (F.). G.B.W., 25/7/18 [A] . . . . . WD
3461. *Rhinoncus perpendicularis* (Reiche.). M.L.T. (1907) [C], W.D.H., 16/6/31, 1/8/42 [*] VL
3466. *Phytobius comari* (Hbst.). W.W.F. (1881) [B], W.C.H. (1907) [C], W.D.H., 1/8/42, 24/7/43 [A] VL
3473. *Limnobaris t-album* (L.). M.L.T., 6/22 [A], W.D.H. [*], 17/6/46, 27/7/46, J.H.F., 16/5/48 [*] L
3504. *Magdalis armigera* (Gfroy.). W.D.H., 24/4/43 [A] . . . . . VL/C
3524. *Hylesinus oleiperda* (F.). W.D.H., 13/6/31 [A] L

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NOTES ON SEEDS AND SEEDLINGS

W. E. L. WATTAM

The Plant Life of Newly Ploughed Land.—I received no response from fellow naturalists to my request for suggestions towards elucidating the problems, especially in relation to the sporadic distribution and occurrence of *Fumaria officinalis* and *Galeopsis speciosa*, detailed in my previous notes published in *The Naturalist* 1941, 104-107. Seed tests to ascertain vitality covering a period of four years gave the following results :—

	Seeds planted June 1941 & 1942, March, 1943 and 1944.	Germination.
Fumaria officinalis L.	95	nil
Galeopsis speciosa Mill.	459	nil
Galeopsis Tetrahit L.	800	73
Spergula arvensis L.	700	243
Chenopodium album L.	800	149
Polygonum Persicaria L.	700	165
Polygonum aviculare L.	700	111

All the seeds were collected in late August, 1940, from the field mentioned in Observation 1 of my previous notes, and all were planted in ordinary garden soil, the planting site remaining undisturbed until November 1946. The area mentioned in Observation 1 was reploughed in November, 1944, and grass sown. The same area was again reploughed in November, 1945, and limed. Oats were the cereal crop in 1946. Three plants of *Galeopsis speciosa* appeared, but no *Fumaria officinalis*. The area was put back to grass in 1947. The non-germination of the seeds of *Fumaria officinalis* and *Galeopsis speciosa* has not assisted in the solution of the extraordinary abundance of these plants in 1940. The germination results of the seeds of the other ruderales set out in the test schedule, and mentioned in my previous notes, are interesting if only from the standpoint of an apparent latency in germination of the seeds of some of the species, the third year of planting proving most successful. Those of *Galeopsis Tetrahit* showed no germination until the third year.

The elusive *Galeopsis speciosa* in 1948 appeared in fair quantity at Stirley Hill, in one of a number of fields ploughed from grassland in 1940. The whole of this area has been under my general observation for 55 years, and no plant of *Galeopsis speciosa* had been seen until 1948.

The Austwick *Aquilegia vulgaris* L.—In 1932 the late Mr. F. E. Milsom planted in his garden at Shepley plants of *Aquilegia vulgaris*, brought from Austwick. For six years these plants, and seedlings therefrom, produced pale blue blossoms only. In 1939 one seedling plant produced white blossoms tinged with pale straw colour. Mr. Milsom gave me seeds of the pale blue and white flowered forms which I planted in my garden on the 6th April, 1940.

White Form. 102 seeds planted. Germination commenced on the 14th May and apparently ceased by the 31st May, sixty-two plants being the resultant progeny, of which approximately one half survived the winter to the spring of 1941. On the 12th June, 1941, one plant produced flowers the petals having a distinct trace of straw colour and green towards the top. All subsequent flowering plants produced only this type of blossom. The radical foliage is light green in colour and quite distinctive.

Pale Blue Form. 239 seeds were planted of which 97 germinated between 14th May and 10th August, 1940. On the 12th June, 1942, fourteen plants produced flowers, five of the pale blue form, four of the white form and five of a maroon colour. Since 1942 these fourteen plants have blossomed each year and shown no variation. By 1944 more plants produced blossoms, the majority being of the pale blue form and two only maroon blossoms. The radical foliage is a pronounced dark green in colour.

Maroon Form. The flowers are of a smoky blue in colour tinged with a deep lilac shade. A small seed test has produced plants true to this coloour. The radical foliage is of an intermediate shade of green, a colour combination of that of the white and pale blue forms.

ORNITHOLOGICAL REPORT FOR NORTHUMBERLAND AND DURHAM FOR 1948

Compiled from the records of members of the Ornithological Section of The Natural History Society of Northumberland, Durham and Newcastle upon Tyne and many other local observers, by George W. Temperley, M.B.O.U.

(A key to the initials appearing in this Report will be found at the end of these notes. Abbreviations : N=Northumberland ; D=Durham ; *B.B.=British Birds* ; *O.R.=Ornithological Report.*)

The number preceding the name of each species refers to Witherby's *Handbook of British Birds*, where the full scientific name will be found.

Where reports are placed in square brackets it is implied that, being sight records only, some slight element of doubt may exist as to the accuracy of the identification, or that the bird was not truly wild.

We are now in correspondence with some 150 observers in the two Counties. The records of 99 of these have been quoted in this Report (see list of names), but many others have contributed interesting observations which it has not been possible to include in the space permitted. The compiler is grateful to all correspondents without whose valued help this Report could not have been written. New contributors are welcome, particularly from outlying districts. All notes should be addressed to G. W. Temperley, Hancock Museum, Newcastle upon Tyne.

It will greatly help the compiler if recorders will :

(*a*) Classify their notes by arranging them in the order in which they appear in this Report.
(*b*) Send notes at more frequent intervals, quarterly, or even monthly.
(*c*) Give full details of the characters by which rare or not easily identified species were recognised in the field.

Records of unusual interest dealt with below are : the phenomenal autumn influx of Snow-buntings (59), the occurrence of two Great Grey Shrikes (114), a Scandinavian Chiffchaff in Co. Durham (130), the return of Montagu's Harriers (272), records of Honey Buzzard (281), Spoonbill (287), Snow Goose (309), Blue-winged Teal (321), Ferruginous Duck (329), Grey Phalaropes (400), the breeding of the Lesser Black-backed Gull in Co. Durham (485), Iceland Gull in Co. Durham (488), the northward movement of Pomatorhine Skuas (492) and Little Auks (502).

Weather Conditions in 1948

In the early months of the year the weather was mild and showery with only an occasional spell of frost and little snow. The most serious frosts came later and destroyed much of the local fruit blossom.

March opened with an unusually mild spell ; hibernating butterflies and other insects were tempted out and on March 11th Rooks were seen building.

April and May, though dull and often cold, were not unfavourable for breeding birds. About ten days of fine warm weather occurred in mid-June and this, with a week at the end of July were the only spells of summer experienced. Most of July was said to have been the coldest for 40 years. August and September were, for the most part, cold, sunless and wet. Harvest was late and much corn stood long in the fields before it could be safely carried. The autumn was remarkably free from east winds which probably accounted for the small number of birds seen on migration. December was unusually mild and Larks and Song-thrushes were heard during the month.

The Wild Fowl Census

As Members are aware, the Ornithological Section made itself responsible for the organisation of the International Wild-fowl Inquiry Committee's Census in the Counties of Northumberland and Durham. This was no light task, as the combined coast-line is fully 100 miles long and the inland waters, lakes, reservoirs, loughs, pools, flooded subsidences and river reaches are widely scattered over fully 3,000 square miles of country, some of which is very remote and inaccessible. Thanks to the zeal of those taking part in the Census, the whole of the coast-line

has been patrolled and more than 70 of the chief inland waters of Northumberland and about 30 of those of Durham have been regularly visited.

Owing to the extent of the area, the co-operation of many observers, in addition to members of the Section, was invited and a total of 76 census-takers has been at work throughout the year. The thanks to the Section are, therefore, due and are hereby gratefully tendered to all those naturalists, sportsmen, fishermen, farmers and gamekeepers who are contributing to the success of the enterprise.

Long distances, short winter days, fogs and gales have hampered observers, sometimes preventing them from reaching their allotted destinations, or from seeing the wild-fowl when they reached them. Such difficulties have not acted as deterrents. One observer regularly covers 20 miles of the roughest moorland from bus route to bus route in order to visit outlying loughs and one intrepid tramper spent a night in the open in order to complete his ' beat '.

The dates on which the census was taken in 1948 were February 7th, March 6th, April 24th, July 10th, October 2nd and 30th, and November 27th.

It is not only the Wild-fowl Inquiry Committee which has benefited from this census. As a result of it the Ornithological Section has already greatly increased its knowledge of the bird life of the two counties. Census-takers were asked to report on other species than wild-fowl and much information is being collected which, as will be seen in the notes that follow, is enriching the annual ' Ornithological Reports '.

It is hoped to continue the Census for a number of years until a series of statistics is available which will show any fluctuations which may be occurring in the numbers of our wild-fowl.

Bird Protection

During the year the County Councils of Northumberland and Durham have both issued new Wild Birds Protection Orders to bring them into line with the Wild Birds (Duck and Geese) Protection Act of 1939. This has provided an opportunity for revising the terms of the Orders. Several important improvements and simplifications have been made in the Orders, which now give to wild birds as much protection as the various Acts permit.

A new feature of both Orders is the placing of certain species, such as the Carrion Crow, Wood Pigeon, and a few more, completely outside the pale of protection. This done, practically all other species, except for certain birds recognised as suitable for human food (the Wild-fowl, Woodcock, Snipe, etc.) and a few birds like the Sparrow-hawk, are protected all the year round. Under the Acts, all species to be protected have to be named in the Order. This makes long lists inevitable, but these have been shortened by the grouping of species under general names, such as ' Gulls ', ' Terns ', ' Owls ', etc. The Order makes it illegal to take the eggs of any of the species already listed as protected all the year round and also of those species that may be shot for food. This provision makes it unnecessary to repeat a long list of names, as has been done in previous Orders. These changes make the Orders much more intelligible to the public.

Another quite new feature in the Order for Northumberland is the clause giving protection to the eggs of all birds within certain areas—these being Holy Island and the shore, above high-water mark, and for 200 yards inland, on the coast from Howick Burn mouth to the Tweed.

Classified Notes

1. Raven.—Cheviot site : two birds were seen in or near the site in March (J.D.T.) and in July (D.M.B.), but no proof of breeding was obtained. Simonside site : the nest was seen to contain four young (per J.A.R.). In the Vale of Whittingham, N., a newly-lined but empty nest was seen in May ; probably the eggs had been taken (W.R.L.).

2. Hooded Crow.—During the winter of 1947-48 a flock, maximum 15 on March 21st, remained near Cullernose Point, N. ; last birds seen on May 20th—a late date (W.S.C.). First autumn bird seen on August 12th on Longhorsley Moor, N., an unusually early date to find one so far inland (E.R.) Many reported later—on November 2nd to end of year, 20 to 30 near Cullernose (W.S.C.) ; November 3rd a flock of 29 as far inland as Staindrop, D. (K.L.) ; November 14th, 80, with 100 Carrions, turning over drift-weed at Budle Bay, N. (F.B.) ; a few regularly visited Darlington Sewage Farm, D. (A. and K.B.).

3. Carrion Crow.—No less than five pairs attempted to breed on the Farne Islands, three on the Brownsman and two on Staple Island (T.R.G.). In a small area round Tritlington, N., 11 nests were found with eggs or young. Clutches were small, none of more than four eggs or young (R.C.).

On April 18th a nest was found only 10 ft. from the ground in a hawthorn hedge, lined entirely with straw and containing three eggs with a light blue ground colour. These were taken. On the 28th, within 20 yds. of the spot, another straw lined nest was found containing two similar eggs, undoubtedly laid by the same bird ; thus, within 10 days the pair had built a new nest and produced two eggs (R.C.).

In June, Mr. J. B. Duncan, of Berwick, witnessed the following incident while watching a breeding pair. One of the pair came flying down the Tweed valley, very high and calling loudly. Its mate left the nest, which contained large young, and flew out to meet it. The first bird dropped an object which its mate, with apparent ease, caught in mid-air in its beak and then carried to the parapet of the Border Bridge where it began to peck it. ' I have seen no previous record of food transference in the air by the Corvidae ' (per F.B.).

Community roosts : Gosforth Park, as late as May 27th, 150 to 200 counted (J.S.A.) ; Dipton Woods, N., over 80 birds in mid-April (A.J.C.) ; Heighington, D., 72 counted on January 15th (K.L.).

4. Rook.—At Darlington on April 29th, at the request of the Durham War Agricultural Committee, the Fire Brigade turned their hoses upon one of the town rookeries, with the result that fledgling rooks were washed out of their nests and fell to the ground where they were despatched in view of numerous onlookers. The object had been the destruction of nests and eggs—young birds had not been expected ! And this at the end of April.

7. Magpie.—On June 23rd, near South Moor, Stanley, D., a completely albino specimen was taken from a nest. Its parents and a fellow fledgling in the nest were quite normal (N.S.B.). Albinism in the Magpie is rare.

14. Starling.—Nested again on the wreck off Alnmouth, N. In December about 60 birds were roosting there (H.T.). The large roost on Messrs. Swan Hunter's shipbuilding sheds at Wallsend was broken up in early autumn by the noise cause by mechanical riveting machines fitted up for that purpose. There is now a number of smaller roosts on different sheds and cranes in the same area (H.W.K.).

20. Goldfinch.—Reported from several districts in the breeding season, though usually no nests were found. Breeding proved near Middleton in Teesdale (H.W.). Considerable flocks seen in autumn. On October 2nd, 30 on knapweed near Morpeth, N. (M.G.R.). On November 26th, 20 near Langley, Haydon Bridge, N. (W.J.).

21. Siskin.—From March 26th to April 18th from two to six birds were seen by several independent observers in Dipton Wood, N. The cocks were heard singing and it was hoped that breeding would take place, but no nest was found (A.J.C., H.R.O., etc.). From April 17th to 28th from one to three birds were seen and heard near Dukesfield, not far from Dipton Wood, but again no nest was found (A.J.C.). Winter records have been few.

29. Twite.—Now a rare species in our counties except on migration. At Warkworth on March 14th, three feeding on the salt-marsh (F.G.G.). At Whitburn, D., on October 28th, a flock of 40, and on November 7th a single bird (J.R.C.). No other records.

30. Linnet.—Winter flock : at Budle Bay on November 14th, *c.* 250 feeding amongst dead *salicornia* (F.B.).

33. British Bullfinch.—Winter flock : at East Bolton, near Alnwick, N., on December 12th, 22 birds (E.M.).

36. Common Crossbill.—A pair was seen and a cock heard singing in Dipton Wood on April 5th, but not subsequently (A.J.C.). From April 16th to 28th a pair, or sometimes two cocks, were seen near Dukesfield, but no breeding was proved (A.J.C.). The only other record of this species was that of a single bird seen in Dipton Wood on June 27th (H.R.O.).

42. Brambling.—Late flocks : numerous on conifers in Dipton Wood, N., in April ; on the 11th *c.* 50, on the 18th ' a large flock ' (A.J.C. H.R.O.).

43. Corn-Bunting.—Unusually numerous : Seaton Burn, N., a flock of 30 on April 21st (M.W.R.). Ross Links, N., a flock of 13 on May 18th, several in

song (J.S.A.). ' I never remember them so numerous as they are this year from Seaton Carew to Greythorpe (Teesmouth) they are singing everywhere. On March 14th some were in song while others still in flocks ' (P.L.H.).

55. Reed-Bunting.—Unusually numerous. At Gosforth Park on July 18th at least 10 cocks singing and at Prestwick Carr on June 13th at least eight. (J.A.M.) On June 13th at Cramlington, N., a cock ' injury-feigned ' when flushed from a nest of young (J.S.A.).

59. Snow-Bunting.—Except for a flock wintering at Teesmouth—January 3rd, 78 ; 17th 31 (K.L.) ; last seen March 25th (D.S.) and another near Newbiggin, N. (E.L.)—few were reported in the early part of the year. A late bird was seen on May 17th near St. Mary's Island, N. (R.D.S.). In the autumn of 1948 unusually large flocks arrived. Most of these passed on down the coast, but many remained throughout the winter. The earliest reported were four birds on September 21st on Holy Island (W.E.O.). Numbers increased during October, the largest flocks arriving in November and early December. Richard Perry wrote from Holy Island : ' From mid-November to mid-December phenomenal numbers, with single flocks containing several thousand birds. The nearest I could get to counting the biggest one was between 2,000 and 5,000 birds. They passed in a few days before the cold spell began'. Another estimate from Holy Island was 4,000 to 4,500 birds (R.H.). Other flocks seen were : Amble N. in November and December *c.* 200 (H.T., A.E.G.) ; South Shields, D., between the piers, on November 10th, 110 (J.R.C.) ; Hebburn Ponds, November 21st, *c.* 100 (J.R.C.) ; Teesmouth, October 31st, *c.* 60 (P.L.H.). Inland : Holborn Farm, N., December 19th, *c.* 40 on stubble (F.B.). Flocks seen at Middleton-in-Teesdale, D., November 14th, 26 ; December 6th, *c.* 60 (H.W.). Many others recorded all along the coast.

62. Tree-Sparrow.—Breeding plentifully along the River Blyth at Blagdon and towards Ponteland, Prestwick Carr, etc. Most nest in holes in trees, but on May 13th a nest was found inside that of a Magpie (J.S.A.). A small breeding colony at Kilham on Bowmont Water, N., nesting in willows (F.B.).

70. Sky-Lark.—On October 7th, between 9 and 10 a.m. in misty weather, several parties of up to *c.* 50 birds passed up the Aln estuary at Alnmouth, probably some 300 to 400 birds in all (H.T.).

72. Shore-Lark.—On February 9th one was seen at Fenham Flats, N. (J.A.M.) the only one reported during the winter of 1947-48. On October 14th one was seen on sand dunes near St. Mary's Island, N. (R.F.L. and D.G.). From October 19th to the end of the year at Warkworth, N., from two to 17, increasing to 21 on January 2nd (A.E.G. and H.T.). On October 23rd a party of five on Holy Island (F.B. and M.G.R.). ' On November 14th at Budle Bay, two watched within 10 yards ; one of which walked on the whole of its tarsi while feeding amongst drift-weed and *salicornia* ' (F.B.).

81. Rock-Pipit.—On the Inner Farne on July 23rd a bird was seen with a small fish in its bill (M.W.R. and J.S.A.).

[84. Blue-headed Wagtail.—One of three ' Yellow ' Wagtails watched on Newton Point on April 24th was certainly not *M. f. flavissima* and was presumed to be a female of *M. f. flava*. (It most closely resembled the first winter female figured on Pl. 24 in the *Handbook*.) Head and crown a shade lighter (greyer) than rest of dull-brown upper parts ; dark brown from gape to eye (lores) ; ear-coverts dark brown ; almost pure white eye-stripe and definite trace of dirty white below the eye ; breast dirty white, almost pale brown towards flanks ; belly pale yellow ; under tail-coverts slightly tinged yellow ; appearance of two white bars on closed wings ; upper-parts dull brown ; white outer tail feathers ; call-note as Yellow Wagtail (J.S.A.).]

88. Yellow Wagtail.—Several pairs breed in the Derwent Valley above Blanchland, but are absent from the middle reaches of that valley (J.E.R.). A pair bred in the Team Valley near Lamesley, D., the first recorded from that area (A.R.H.).

On migration—on May 5th, 20 to 30 at Darlington Sewage Farm (A. and K.B.) and on September 8th a party of *c.* 13 at Primrose, Jarrow, D. (F.G.G.).

89. Grey Wagtail.—Some recovery in numbers reported from various places in both counties ; but still far less common than before the 1946-47 winter (M.W.R., J.E.R., L.P.H., C.H., etc.).

On November 4th, two seen in Jesmond Dene (W.A.W.).

90. Pied Wagtail.—R.C. reports having witnessed a pair displaying in the exact manner described and figured in *B.B.*, Vol. XLI, p. 306. In February at Frankland, D., a roost occupied by *c.* 70 birds was a small hawthorn bush surrounded by water and only rising three feet above it (J.R.C.).

91. White Wagtail.—Several reported on migration—Berwick, April 14th, a pair ; 21st and 23rd, a hen (F.B.). Boulmer, N., April 24th, four (H.R.O.) ; Beadnell, April 26th, a hen (J.S.A.) ; Teesmouth, D., May 6th, several about, including one party of eight (F.G.G.). Sadberge, D., September 9th, four (K.L.). Teesmouth, September 26th, five (P.L.H.). Berwick, September 20th, one hen (F.B.).

93. Tree-Creeper.—Few reported during summer ; but more were seen, with flocks of Tits in autumn and winter, than in the previous year.

96. Nuthatch.—From January to April, one seen and heard on the Banks in Durham City (J.E.C.) (J.R.C.). Extending its range in the Darlington area (A.S.). On July 22nd a party of four near Darlington (K.L.) ; heard at Staindrop, D., in August and September (M.W.R.). Bred at Barnard Castle (H.W.).

98. Great Tit.—In nesting boxes in the Forestry Commission's plantations at Hamsterley, Co. Durham, 19 pairs reared only 62 young, an average of 3·3 per brood, whereas in 1947, 20 pairs reared 156 young, an average of 7·8 per brood. C.P. writes : ' Last winter I stopped up a hole in a small pane of glass in an outer door with a piece of cardboard ; hearing a tapping noise I went to the door and found a Great Tit tearing out the cardboard. Is this a perversion of the milk-bottle habit? '

100. Blue Tit.—In nesting boxes in the Forestry Commission's plantations at Hamsterley, Co. Durham, 11 pairs reared 106 young, an average of 9·6 per brood, this being a slight increase on 1947 when five pairs reared 44 young, an average of 9·1 per brood.

102. British Coal-Tit.—An adult ringed at Blagdon on March 16th, 1947, was recovered where ringed on January 9th, 1948 (A. and R.).

108. British Willow-Tit.—On June 19th two separate families were noted at Gosforth Park (W.R.L.). A few pairs at Blagdon, but restricted by lack of rotten timber in which to nest (M.W.R.). Prestwick Carr, N., two pairs seen but no nest found, though several young seen later (J.S.A.). On May 17th a pair was seen near Scales Cross, Stocksfield, N., the first recorded from that neighbourhood (J.A.M.). A nest with 10 eggs was found in a dead holly stump in Ravensworth Park, Team Valley, D. (A.R.H.).

111. Long-Tailed Tit.—Many observers report an increase in the number of breeding birds and, later, in the numbers of family parties of young ; though in some districts they are stated to be still much less numerous than they were two years ago.

114. Great Grey Shrike.—In the latter half of January and the first week of February, two birds remained in the neighbourhood of Whitley Chapel, Hexhamshire, N. They were seen by several observers perching on a wall near the church and on fences along the roadside (J.A.).

120. Waxwing.—Very few records. In January a single bird was seen several times near East Bolton, Alnwick (E.M.). On January 24th three were seen in a thorn hedge near Beal, N. (G.D.S.). On March 24th one seen at Felton (H.T.).

The first autumn record was a bird picked up dead near Rye Terrace, Hexham, on November 20th, presumed to have struck electric wires (per W.J.). About Christmas time two were seen near East Bolton, near Alnwick (E.M.). These were the only records in our area ; but a flock of about 30 birds frequented Albert Park, Middlesbrough, Yorks., just outside our district, during December (O.C.H.).

123. Pied Flycatcher.—In the plantations of the Forestry Commission in Co. Durham the breeding population, encouraged by the provision of nesting boxes, is steadily increasing. Although many nestlings have been ringed in 1946 and 1947, no marked bird has yet been recorded as returning to breed (M.F.A.). This year 30 pairs reared 170 young, an average brood size of 5·7 which is the same as in the previous year.

127. Goldcrest.—Near Longhorsley, on an estate of 500 acres, only one pair nested in 1947 and seven or eight pairs in 1948, as compared with a normal 25-30 pairs in previous years (E.R.).

129. CHIFFCHAFF.—Rather more reports than usual in the Tyne Valley : Stocksfield (G.W.T.), Dipton Wood (A.J.C.), Beltingham, N. (C.J.G.).

130. SCANDINAVIAN CHIFFCHAFF.—On August 11th, Dr. H. M. S. Blair identified a bird of this species, with which he is already familiar, in his own garden in South Shields. He writes : ' I was struck by its very brown plumage—it seemed almost as brown as a Garden Warbler. It proved to be much more wary than a Willow Warbler would be and sought cover in an elder, but betrayed its whereabouts by suddenly calling. The notes were most surprising in their resemblance to the cheeping of a domestic chicken in distress and left me in no doubt as to its identity.'

135. WOOD WARBLER.—May 5th and 12th, but not thereafter, one heard in Jesmond Dene (H.R.O.).

153. SEDGE WARBLER.—On July 18th at least 10 cocks were singing in Gosforth Park (J.A.M.). At Seaton Burn, N., on May 28th a nest was found containing six very fine erythristic eggs (J.S.A.).

162. BLACKCAP.—In winter : ' From January 19th to February 12th a cock Blackcap daily visited my garden in The Grove, Gosforth ' (G.W.).

163. WHITETHROAT.—On June 13th at Cramlington a bird, put off its nest of young, ' injury feigned ', tumbling and fluttering off along the ground (J.S.A.).

173. FIELDFARE.—Fewer and smaller flocks reported this autumn than usual. On October 30th at Whitburn, D., at 11-50 a.m., four were seen flying in from the sea ; at 12-35 p.m., 24 more (J.R.C.).

174. MISTLE-THRUSH.—Probably suffered more than any other species during the 1946-47 winter. Still very scarce in many parts of the two counties and quite absent from large areas. A few pairs near towns survived—one pair resident and breeding successfully in the Hancock Museum grounds (G.W.T.), another in the Exhibition Park (C.J.G.), and another near Little Bridge, Gosforth (C.J.G.).

175. SONG-THRUSH.—Gradually increasing in numbers, but still below normal. Increase most marked in parks and gardens where food supplies were ample.

A young bird ringed at Seaham, D., on May 28th, 1947, was recovered at Guisborough, Yorks. (25 miles S.S.E.) on November 14th, 1947 (*B.B.*, XLI, p. 364)

178. REDWING.—Fewer and smaller flocks reported than usual. On October 30th at 12-35 p.m. six were seen flying in from the sea at Whitburn, D., with Fieldfares (J.R.C.).

182. RING-OUZEL.—On migration at the coast : on October 9th a cock and hen were observed amongst bushes at Salmon's Hall near South Shields ; when disturbed seven other birds of the same size flew out, but were not definitely identified (F.G.G.).

184. BLACKBIRD.—Ringing records : a first winter female ringed at Gosforth, N., on March 5th, 1944, was recovered at the same place four years later, February 1st, 1948 (A. & R.). An adult male ringed at Blagdon on March 18th, 1947, was recovered in the same locality on July 15th, 1948 (A. & R.). An adult male ringed at Alnmouth, N., on February 3rd, 1946, was recovered at Aalesund, Norway, on October 18th, 1947 (*B.B.*, XLI, p. 364). An adult ringed as a migrant on Heligoland on March 10th, 1939, was recovered at Embleton, N., on February 17th, 1940 (*B.B.*, XLI, p. 174).

186. WHEATEAR.—On March 7th one seen on Holy Island : ' I have never seen one so early before ' (R.H.). On March 20th two cocks seen near Seaton Sluice, N. (R.D.S.). On April 25th at Seahouses, N., a flock of *c.* 60 feeding on a field of wheat (J.S.A.). On August 26th near St. Mary's Island, N., 20 birds were counted along 100 yards of shore (R.D.S.).

187. GREENLAND WHEATEAR.—On May 3rd at Seaton Burn, N., an adult pair and two hens were identified on passage. They were noted as being larger and brighter than the British race breeding there and on being disturbed tended to seek the topmost branches of trees. ' I am familiar with this species on the coast ' (J.S.A.). On May 6th at Teesmouth, D., two cocks and a hen. ' I had the rare experience of seeing a cock Greenland and a cock Common together on the top of the same concrete pillar ' (F.G.G.). On October 30th one seen at Marsden, D. ' Astonishingly confiding, perching only 5 or 6 yards away ' (J.R.C.).

197. WHINCHAT. On November 8th at Hartley, N., a cock on the cliff top. An unusually late date (J.R.C.).

198. Stonechat.—Very few indeed recorded and no breeding proved. 'We made a special search along the coast and found none from Seaton Sluice to Druridge Bay or between Longhoughton and Ross Links.' (A. and R.). The following are the sole records from the coast : On February 1st one at Alnmouth (H.T.). On February 7th a cock near Seaton Sluice (D.R.S.). On April 24th a pair north of Newbiggin, N. (D.M.R.C.). On September 17th four at Craster, N. (H.T.) On November 4th a cock at Seaton-Sluice, N. (H.R.O.). On November 17th a pair between Craster and Howick, N. (W.S.C.). It will be noted that with one exception all these dates are well outside the breeding season. Inland : several pairs on the edge of the moors about Wolsingham, D. (R.M.). One only by the Lewis Burn, North Tyne, on June 6th (J.D.T.). None seen in the Cheviot and Wooler district in 1948 (J.D.T.).

202. Black Redstart.—The adult cock reported as wintering near St. Mary's Island (*O.R.*, 1947) remained until February 1st, 1948 (H.R.O.). On January 26th and 30th one seen at Manhaven near South Shields, D., for the fourth consecutive year ! (J.R.C.) (see previous Reports). On April 18th a cock was seen on two occasions, twice in Howick, N., and once on fields to the north of that village (W.S.C.). On April 22nd and 24th a cock was seen on Holy Island (A.J.C. and R.H.). On December 5th one on the Castle Hill, Tynemouth (W.N.G.).

213. Wren.—Numbers increasing steadily.

218. Dipper.—Numbers recovering slowly on most rivers and streams but still much below normal everywhere.

225. Swift.—A nestling, fallen from a nesting site at Forest Hall, had six parasites (Hippoboscae) on it, each the size of a house-fly (M.G.R. and G.C.V.).

234. Kingfisher.—Still very scarce indeed. At Weldon Bridge, N., a pair reared two broods in the same nesting hole (E.R.).

237. British Great Spotted Woodpecker.—One pair bred successfully in Gosforth Park (W.R.L.) but another nest there was interfered with and was deserted (J.S.A.). On November 7th one was seen in Throckley Dene, Newcastle (W.A.W.).

238. Lesser Spotted Woodpecker.—A single bird was seen in the town of Darlington on March 12th (A.S.) and again on November 16th (K.L.). There are few authenticated records for this species in County Durham and only one definite record of breeding, which took place in the West Cemetery at Darlington in 1934. One of the young birds was identified on that occasion by A.S.

240. Cuckoo.—From May 11th a bird haunted suburban gardens at Gosforth. Later at least two young were seen with Hedge-Sparrows as foster-parents (S. and J.S.A.). During the spring and summer three birds frequented Gosforth Park ; though the species parasitised was not ascertained, Sedge Warblers would appear to have been the most likely species, but on May 25th five nests with eggs of this bird were found, none of which contained the egg of a Cuckoo (J.S.A.).

249. Little Owl.—Numerous reports from many parts of Northumberland, some from outlying areas : near Kidlandlee, River Alwin N. (J.D.T.) ; area north of Wooler (R.G.G.) ; Longhorsley (E.R.) ; Bardon Mill (W.J.) ; Holy Island (R.P.).

250. Long-eared Owl.—A pair almost certainly bred successfully in Gosforth Park (K.N.G. and W.R.L.).

251. Short-eared Owl.—Birds were reported from the moors during the summer, no doubt breeding : Upper Coquetdale (J.D.T. and W.R.L.), North Tyne (J.D.T.), N.W. Durham (J.P., A.R.H. and others), Upper Teesdale (H.W.).

On September 15th one seen flying in from the sea at Alnmouth (H.T. and R. M. Garnett). On October 30th at 11-25 a.m. one seen flying in from the sea at Whitburn, D. (J.R.C.). In autumn more than usual seen on or near the coast (D.M.B., H.R.O., O.C.H., F.G.G., H.W.K., etc.).

253. Tawny Owl.—At Blagdon six nests were found from which 14 young were reared (A. and R.). At Kirkley a nest was found in a hollow ash tree containing one egg ; this hole was later usurped by a pair of Jackdaws who built a nest and laid four eggs. The Owls returned and laid two more eggs in the Jackdaws' nest, but later deserted (J.S.A.).

254. White-breasted Barn Owl.—In spite of severe losses in 1947, three pairs bred near Blagdon, N., and reared eight young ; there was evidence of a

fourth pair (M.W.R.). A pair nested on Durham Cathedral and reared two young (J.L.C.).

259. Peregrine Falcon.—A pair had four eggs on a rocky portion of one of the Simonside burns (per J.A.R.) ; where the parent birds were frequently seen by other observers (J.D.T., etc.). In July three were seen together on Cheviot, which suggests successful breeding there (D.M.B.).

268. Rough-legged Buzzard.—On February 28th one was seen near Broomlee Lough, N. (J.R.C.). On November 21st two seen together near Kimmer Lough, West of Alnwick, N. (E.M.).

272. Montagu's Harrier.—Successful breeding took place on the west Durham Moors for the second consecutive year. Birds were first seen on May 9th and last seen on August 24th.

[A single bird, haunting the moors west of Alnwick during the summer, was probably of this species (E.M.) and a Harrier seen near Elsdon, N., in August may also have been of this species (F.C.P.).]

277. Sparrow-Hawk.—A nest was found in a high oak at Gosforth Park, but later the eggs were taken (J.S.A.).

281. Honey-Buzzard.—' On the morning of June 7th Major Potter of Bilton informed me that he had a " Buzzard " in his garden. I went along and identified it as a Honey-Buzzard. Later in the day, Mr. and Mrs. A.E.G. joined me and we had excellent views of the bird at close range. The characteristic yellow irides and short feathering about the head made identification certain. At times it was seen to feed upon insects in long grass. It was last reported in the district on June 9th ' (H.T.).

287. Spoonbill.—At Beadnell on May 16th at 8-40 p.m. a bird of this species was observed flying north at *c.* 100 ft. and a quarter of a mile inland. It flew with fairly slow but regular wing-beats in a straight flight-line occasionally gliding for a few seconds. Feet trailing out behind and spatulate bill were quite obvious in flight. A fine white bird. It was thought that it might have been bound for Budle Bay or Ross Links ; but a search two days later failed to discover it (S. and J.S.A.).

289. Common Heron.—Northumberland Heronries : Chillingham, 10 nests occupied (T.R.G.) ; near East Bolton, Alnwick, two nests (E.M.) ; Shipley Moor, none (H.T.) ; Blagdon Estate, none (M.W.R.) ; Prestwick Carr, none but three pairs nested in 1946 and all reared young (J.S.A.) ; Allen Banks, Bardon Mill, one nest only (D.M.B., N.A.R.) ; Styford, Tyne Valley, the last trees in the Heronry having been felled the birds crossed the river Tyne to a rookery at Grey Court, where five or six nests were built and at least five occupied (T.F.H.) ; one pair nested near Riding Mill railway station (C.J.G.).

Durham Heronries : Dynance Wood, Gainford, Tees Valley, five nests occupied (A.S. and R.O.V.) ; Whitworth Park, Spennymoor, D., one nest (C.G.).

A Heron ringed at Rogaland, Norway, as young on June 7th, 1945, was recovered at Seahouses N. on November 3rd of the same year (1945) (*B.B.*, XLI, p. 174).

300. Whooper Swan.—As previously reported (*O.R.*, 1947), Whoopers were numerous and well distributed in the winter of 1947-48. On February 7th there were *c.* 200 near Holy Island and on March 6th *c.* 70 (R.H.). On February 7th there were 33 on Bolam Lake (J.D.T.) and on March 6th 61 on Capheaton Lake (H.W.K.) and 12 at Hartburn Grange (M.G.R.).

In the winter of 1948-49 fewer were reported : on October 21st 28 on Grindon Lough (R.G. and E.M.L.) and on November 1st only 47 on all the Bardon Mill Loughs together (D.M.B.) while the Census on November 27th showed only 125 in the whole County of Northumberland.

301. Bewick's Swan.—Very few reported. In March and early April, 12 were on Kimmer Lough (E.M.) and on March 6th a single bird was seen on Hell Kettles near Darlington (K.L. and A. and K.B.). In the late autumn six were again on Kimmer Lough (E.M.). None was reported from the Bardon Mill Loughs, where a small flock usually winters.

303/307. ' Grey Goose.'—On February 7th there were *c.* 2,000 (Pink-footed and Grey-Lags together) about Holy Island and on March 6th *c.* 500 (R.H.). On March 15th a white (albino ?) goose seen at Goswick, N., in company with eight Grey Geese. The flock was stalked to within 80 yards and the others were identified as Grey-Lags (per R.H.). This bird had no black primaries, so could not have been a Snow Goose (see below). In the autumn and winter there were

many reports of unidentifiable ' Grey Geese,' sometimes in large flocks, flying over many parts of both Counties. This suggests either that there were many more geese wintering with us than usual, or that they were flying further afield from their roosting haunts for feeding purposes.

303. Grey Lag-Goose.—On January 4th, 23 on Budle Bay (H.T.). On January 14th one shot out of a party of three at Blagdon, N., ' the first ever seen to alight here ' (M.W.R.). On April 3rd on Druridge Farm, N., a flock of 12 was identified—the farmer reported that there had been more during the winter (M.G.R.). On April 10th, seven on Holy Island sands (F.B.).

In the autumn, the Census of October 30th showed a total of *c.* 350 birds. On October 23rd a single bird was identified at Gosforth Park (K.N.G.).

307. Pink-Footed Goose. From March 25th to May 6th a single bird was repeatedly seen on Grindon Lough. It was seen flying strongly, so was not thought to be a ' pricked ' bird. (T.F.H. and others).

In the autumn, the Census of October 2nd showed a total of *c.* 275 at Holy Island, increasing to 500 on October 30th and 1,500 on November 27th, but by the end of the year only 500 to 550 (R.H.). At Whitburn, D., on September 27th, 17 ; on the 30th, four ; and on October 23rd, 14 (J.R.C.). At Smiddyshaw Reservoir, D., on November 27th, 10 (J.J.R.). On December 19th at Hartley and St. Mary's Island, N., 305 (J.R.C.) and on the same day near Swinhoe Pond, N., *c.* 400 (F.B.).

[308. Snow-Goose.—Dr. S. Basham writes : ' On October 5th at 9-30 a.m. at Fenham-le-Moor, N., I saw a white goose flying into Fenham Slakes. At 4-0 p.m. the Slakes becoming covered with water, as high tide was at 5-30, the same bird flew from the Slakes back again into the country. As it was only 200 yards away I was able to look at it carefully through 10×40 binoculars. It was rather larger than a Shelduck with no trace of colour such as a Shelduck would have shown. As it flew away I was able to make out quite clearly its black primaries. I have been interested in wildfowl for many years and have watched them ashore and afloat in a gunning punt, but have never previously seen a goose of this description. After careful consideration I am sure that it was a Snow-Goose, probably the Lesser Snow-Goose owing to its size.' No other reports have come in concerning this bird.]

311. Barnacle Goose.—On October 2nd there were 15, and on the 30th 18 near Holy Island (R.H.). On October 4th at 9-0 a.m. six flew N.W. over Alnmouth (H.T.). Last year on October 3rd a flock of 13 was seen at the same place, also flying N.W. (H.T.). (See *O.R.*, 1947.)

312/313. Brent Goose.—The birds wintering near Holy Island, *c.* 300, left on March 10th. They were seen at sea seven to eight miles out heading E.N.E. and flying high (R.H.). On October 12th a dozen arrived on the coast near Holy Island, and early date (S.A.) and up to the end of the year there were only 17 (R.H.). On December 12th five were identified at Whitburn, D. (J.R.C.).

315. Shelduck.—The March Census showed a total count of *c.* 400, the largest during the year. On July 10th there were *c.* 200, by October numbers had fallen greatly.

On March 27th a pair appeared on Gosforth Park Lake (D.R.S. and K.N.G.). Two pairs bred near Alnmouth, the first brood appearing on June 13th (H.T.). On November 11th, 30 to 40 passed Souter Point, Whitburn, D., flying S. (J.R.C.).

317. Mallard.—Census returns showed a total of 4,000 in February falling to 400 in April, 500 in July, rising to 4,000 again in November. In Gosforth Park the maximum number was 900 counted on February 7th, the minimum 37 on July 10th, this figure increasing to 550 by the end of the year.

318. Gadwall.—The earliest bird recorded was one at Capheaton, N., in the second week of February (J.R.C.). On March 1st one was seen on Bolam Lake, N. (J.R.C.). On April 13th a pair was seen at Teesmouth, D. (J.R.C.). On April 24th there were four on Waskerley High Reservoir, D., where eight had been seen at the same time last year (R.M.). On September 1st there was a single drake on Grindon Lough (R.G. and E.M.L.). From early September to mid-October one was frequently seen on Gosforth Park Lake (K.N.G. and H.R.O.).

321. Blue-winged Teal.—On April 17th J.R.C. saw a drake of this species on a reedy pond about 1½ miles from the coast in S.E. Northumberland. It was in company with six Shoveler, several Tufted Duck, a pair of Pochard and a pair of Garganey. Pencil sketches and notes made on the spot leave no doubt that the

bird was correctly identified. The pond was visited later (by J.R.C., G.C.V., M.G.R. and G.W.T.) but the bird was not see again (see *B.B.*, XLI, p. 350).

Notes on recent occurrences of this species in England will be found in *B.B.*, Vols. XL., p. 281, and XLI, p. 121.

322. Garganey.—During the year Garganey were reported from no less than ten different waters. Most of them were recorded for the first time during the Wildfowl Census of April 24th and were not seen again later. At one pond three were still present until July 10th, and on another a pair remained until July 19th. In this latter instance, owing to the frequent absence of the female, breeding was suspected, but no young were seen.

323. Wigeon.—Very plentiful on the coast. On October 22nd *c.* 10,000 were feeding in one huge flock on Holy Island slakes, the wind being from the north for three days (R.H.). On October 27th, the day before the S.E. gale began, about 1,000 were seen near the Farne Islands : ' I have often noticed that about two days before a gale, especially from the seaward, the ducks come and land on the Farnes in great numbers ' (R.S.R.). On November 14th about 20,000 on Holy Island sands and Fenham flats (F.B.).

A six weeks old Wigeon ringed in the environments of Skattrasket near Arvidsjaur, N. Sweden, on July 22nd, 1947, was shot at Alnmouth on or about October 28th, 1947 (per H.T.).

325. Pintail.—Pintail occurred in every month of the year. Most of the reports were of single birds, occasionally of pairs ; but on the Tees estuary on September 28th 22 were counted (J.R.C.). From one to three birds were recorded as being on Gosforth Park Lake every month from January to August and again in October and December (J.S.A., H.R.O., D.R.S. and others).

326. Shoveler.—Most numerous in March and October. Breeding was proved on four different waters. The largest number seen together was on Gosforth Park Lake where, on March 27th, *c.* 50 were counted.

328. Common Pochard.—Breeding was proved on two widely-separated ponds in Co. Durham (J.L.C. and J.R.C.).

329. Ferruginous Duck.—On April 3rd and 6th at Hebburn Ponds, D., an adult drake Ferruginous Duck was seen and identified by J.R.C. On the 7th M.G.R. and G.W.T. went together to see it. Every detail of its plumage was noted at close range, including the characteristic white eye. It was associating with a pair of Tufted Duck, diving when they dived. It appeared to be a truly wild bird, for it was very alert and wary—more so than its companions the Tufted, for when alarmed by a passing dog it flew, while the Tufted only swam away. The sickle-shaped white marking on the wings were very distinct in flight and while diving the white under-tail coverts were seen in contrast with the black tail. The ponds were visited again on April 8th and 9th, but the duck was not seen again (G.W.T.).

To a note in *B.B.* (Vol. XLII, p. 61) recording this occurrence the Editors add this comment : ' Although it is scarcely possible to be certain that Ferruginous Ducks in this country are not " escapes," it is deserving of note that although there has been an increase in the number reliably recorded in recent years there are now excessively few in captivity in the British Isles—only two drakes are recorded in the latest summary of the Avicultural Society's " Waterfowl Registry." There is thus a good *prima facie* case for regarding apparently wild birds as actually so and for thinking that the visits of the species to this country may be actually becoming somewhat more frequent.'

330. Tufted Duck.—Breeding was proved on four inland waters, three of them in Co. Durham. On one 12 broods were reared and 46 young were counted as late as August 2nd (J.R.C.). On another pond five pairs bred and 24 young were counted (J.L.C.). On a Northumberland lough a brood of eight was counted (M.G.R.).

A flock of up to 27 birds spent the autumn with domestic ducks on Leazes Park Lake in Newcastle (F. Brown).

331. Scaup-Duck.—After being more than usually plentiful during the winter of 1946-47 this species was much less numerous during the winter of 1947-48. ' Off the Durham coast between September and April I only met with five birds ; the normal winter flocks, of which there are usually several, did not appear ' (J.R.C.). In the autumn of 1948 more were reported and odd birds, usually females, were

seen inland, as at Gosforth Park Lake (K.N.G.), Whittle Reservoirs and Greenlee Lough (J.A.M.).

334. Long-tailed Duck.—Very few reported during the winter of 1947-48. 'On the Durham coast only two single birds were noted during the whole winter' (J.R.C.). Few were recorded for Northumberland, but on April 10th at Goswick a drake in almost complete breeding plumage was seen with two ducks (F.B.) and on April 24th at Beadnell a pair in breeding plumage was seen (J.S.A.).

More birds were seen off the coast in the autumn and an immature bird was on Gosforth Park Lake from October 30th to December 1st, where it was recognised by many observers.

337. Common Eider.—On March 25th to 27th a census of Eiders was made along the whole of the Northumberland coast from Tynemouth to the Border, but not including the Farne Islands, by J.R.C. The total number counted was 623. Of those whose sex could be determined 156 were adult males, 44 immature males, and 195 females.

On Holy Island few young were reared. This was attributed to a fox which had a litter of cubs on the Snook (R.H.) ; but doubtless many eggs were collected for human consumption. On the Farnes the nests of breeding birds were not counted, as it was important that the sitting birds should not be disturbed ; but it was estimated that they were quite as numerous as in the preceding year. On Coquet Island on May 9th 62 pairs were counted, many ducks sitting. Later, the lightkeepers reported that they had counted 110 nests. On July 27th 41 ducklings were counted near the Island and along the shore (A.E.G.).

339. Common Scoter.—The usual large flocks were seen off the coast at various places. On March 19th a flock off Cheswick, N., consisted of 350 immature birds ; on May 9th it had increased to *c.* 1,400, all adults (F.B.). During the winter a flock was stationed off Seaton Sluice, N. First seen on October 3rd, it remained until the end of the year. Its numbers varied, increasing to a maximum of *c.* 250 in December ; very few adults were seen in it (H.R.O., D.R.S., D.M.B. and others). Inland records : on April 24th a drake was displaying to a duck on Whittle Dene Reservoirs (D.M.B.), and on October 31st a single drake was seen on Kimmer Lough, N. (E.M.).

340. Velvet Scoter.—Several noted in the summer : on July 9th, eight flying N. off Whitburn, D. ; July 10th, four flying N. at Marsden, D. (F.G.G.) ; on July 16th, four flying N. near the Farnes (J.M.C.) ; August 28th one off Seaton Sluice, N. (M.G.R.). 'Markedly prevalent off the coast in the autumn' (J.R.C.). On October 24th, at Alnmouth, 15 flew N. in four parties (H.T.). On October 30th off Whitburn 31 flying N. in five parties (J.R.C.) and many other small parties reported elsewhere.

342. Goosander.—A pair bred again in the same hollow tree in Upper Coquetdale ; eggs were seen in the nest and later, July 10th, a brood of 12 was counted (T.G.W.). Reports show that birds were more numerous and more widely distributed during the winters of 1947-48 and 1948-49 than in any previous years. The Wildfowl Census figures show that on March 6th on seven inland waters a total of 65 birds was present. Between October 2nd and November 20th from one to four birds were seen on Gosforth Park Lake (H.R.O., J.A.M. and others).

343. Red-breasted Merganser.—Not seen off the Durham coast after March 16th when there were 10 at Seaton Carew (J.R.C.) ; but on May 22nd on Fenham Flats, N., there were 13 drakes (F.B.), and on July 4th a flock of 33 was counted off Alnmouth (H.T.). Several flocks were reported in autumn—on October 25th, off Goswick, N., a flock of 10 flying N. (F.B.) and on November 25th, at South Shields, a string of nine, all red-headed (J.R.C.).

344. Smew.—Unusually few reported. In February one at Capheaton Lake (J.R.C.). On October 23rd an immature bird at Holywell Ponds (J.R.C.). On November 1st an adult drake on Broomlee Lough (D.M.B.). On November 28th, two red-headed, at Capheaton (J.R.C.).

346. Cormorant.—The breeding colony on the Megstone, Farne Islands, appears to be as large as ever, though many nests were swept off the island by storms during the breeding season. Three young birds ringed there on July 23rd have already been recovered—one on November 21st at Boston, Lincs., one on November 26th at Nantwich, Cheshire, and a third at North Berwick (A. and R.). On March 20th an adult with white chin and thigh patches was seen on Broomlee Lough (H.R.O.).

348. Shag.—On the Farnes about 40 breeding pairs were counted on Staples Island alone and there were several on the Inner Farne cliffs (T.R.G.). A pair bred as usual on the Dunstanburgh cliffs and raised two young (F.G.).

349. Gannet.—A large autumn movement to the north was witnessed off Whitburn, D. : on October 28th during a nine-hour census 1,400 were counted, of which 1,000 were adults, 220 second year or later, and only 170 young of the year ; on November 7th during an eight-hour census 178 passed (J.R.C.). (See *O.R.*, 1947, for a similar movement at the same time of year).

350. Storm-Petrel.—On October 28th one was picked up on Alnmouth railway station in a weak state (H.T.).

355. Manx Shearwater.—Many more reported than usual. First seen April 24th, a single bird flying N. off Newton Point, N. (J.S.A.). Most seen in July and early August ; largest number on July 10th when *c.* 20 off Beadnell (H.T.), 12 off Marsden, D., and four off Whitburn (F.G.G.). Last seen September 20th, a single bird off Holy Island (H.R.O.).

[360. Great Shearwater.—On June 28th at 5-35 p.m. off Cullernose Point N. a Shearwater was seen flying N. low over the sea. It was as large as a Fulmar and a paler colour than a Manx Shearwater with the typical Shearwater flight. Considered to be of this species (J.S.A.).]

[363. Sooty Shearwater.—On September 21st two off Whitburn, D. (J.R.C.)]

368. Fulmar Petrel.—Durham coast S. of Seaham—on May 15th, 20-30 pairs (P.L.H.) ; Marsden—first seen on January 2nd, many by the 12th, a strong colony again ; birds for the 1949 season arrived by December 19th, 1948, and on the 24th there were 20 to 30 present (F.G.G.). Hartley, N.—first seen February 1st (H.R.O.) ; up to 10 birds haunted the ledges until July 30th, but no breeding was proved (D.R.S.) ; on December 12th one was already on the cliff. Cullernose and Howick—February 8th, 65 counted, March 7th, 60 (H.R.O.) ; June 28th, 27 pairs, but no eggs or young seen (J.S.A.) ; December 18th, already 20 or more birds, some sitting on ledges (T.F.H.). Seahouses—April 25th, three pairs on seabanks (J.S.A.). Bamburgh Castle rocks—June 14th, three or four sitting (G.W.T.). Farne Islands—five pairs bred on the Inner Farne (T.R.G.). Holy Island—first seen on November 25th of previous year (R.P.) ; arrived in force on December 10th (F.B.) ; by February 7th there were 70-80 at the Coves and 12-20 at the Castle (R.H.). Kyloe—June 1st, four birds sitting on eggs ; June 23rd, five eggs seen ; June 28th, two eggs gone and one adult bird dead on ledge ; July 24th, last egg hatched, but only two young left alive (F.B.). One egg was at the entrance to a crack in which were young Jackdaws ; the parent Jackdaws would have to squeeze past a sitting Fulmar or hop over its head in order to feed their young (F.B.).

370. Great Crested Grebe.—Again no breeding was recorded in either County.

374. Black-necked Grebe.—Only one adult appeared this year on the pond in Co. Durham where they have previously bred. It remained there from April to September without a mate (J.L.C. and J.R.C.). On August 13th an immature bird was seen on a pond in S.E. Durham, but it had not been bred there (D.S.).

380. Wood Pigeon.—Early breeding : on March 12th a recently-fledged bird was shot at Callerton, N., its weight was only 11 oz. instead of the normal adult weight of 18 oz. (per S.E.C.). At Blagdon, N., a nest was found built upon that of a Song-Thrush and another, in a hedge-row, was built of straw (M.W.R.). A nestling ringed at Blagdon on August 12th, 1943, was recovered at Dalton, Ponteland, N., on April 1st, 1948. Nestlings ringed at Blagdon in August and September, 1947, were recovered in 1948 as follows : Thirsk, Yorks., March 13th ; Washington, D., January 31st ; Winlaton, D., April 24th ; Cramlington, N., August 3rd ; where ringed August 4th (A. and R.).

383. Turtle-Dove.—On June 14th and again on July 10th one or two were heard near Waren Mill, N. (H.T. and G.W.T.), and on September 3rd one was seen at Fenwick Mill, N. (T.F.H. and G.W.T.). On June 14th one was seen at Craster, N. (J.M.C.). Several family parties seen near Baydales, near Darlington (K.L.) and at Darlington Sewage Farm on August 13th two (A. and K.B.), and on September 12th one (M.H.R.).

386. Bar-tailed Godwit.—On July 15th *c.* 60 arrived at Teesmouth, an early date (K.L.).

387. Black-tailed Godwit.—On February 8th 10 were seen on Fenham Flats (J.L. and J.A.M.). On May 8th, a misty morning, two were seen flying south at Gosforth Park (J.D.T.).

388. Common Curlew. In mid-Northumberland many pairs are breeding, from the fields near the coast right up to the moorlands. Two pairs nested within 100 yards of one another and within 50 yards of a road, from which one of them could easily be seen sitting (R.C.).

389. Whimbrel.—'A Whimbrel year.' On July 29th at Cheswick, N., 22 birds seen flying S. and on the 31st, with mist at sea, 42 birds flying south ; an hour later 52 came in from the sea and turned south (F.B.). At Alnmouth first seen on July 14th, three birds ; some, up to seven birds, nearly always present there up to mid-August and on odd occasions up to September 27th (H.T.). On July 28th a flock of 20 passed over Harton, South Shields, flying south (F.G.G.). Many others reported elsewhere.

393. Woodcock.—At Blagdon very few and breeding population still below normal (M.W.R.). On March 21st at dusk five birds were seen in flight in Gosforth Park (W.R.L.). In Wolsingham district, D., they were plentiful, several nests being found (R.M.). On October 28th one and on the 31st four seen flying inland over South Shields (F.G.G.).

398. Jack Snipe.—More records than usual. One on a marshy pond in N.E. Durham as late as April 3rd (F.G.G.). On October 10th one was picked up injured in Davison Avenue, Monkseaton, N. (per J.S.A.).

400. Grey Phalarope.—On October 24th one was seen swimming in the sea just off the rocks at Seaton Sluice, N. The description made on the spot left no doubt that it was a bird of this species and the observer later confirmed his identification on seeing the specimens in the Hancock Museum (H.R.O.). On October 28th one off Whitburn, D., was watched while on the wing and in the water until it flew away to the N., 'Only a few yards from the spot where I last met with this species nearly 20 years ago' (J.R.C.). On November 7th another single bird was seen off Whitburn, also flying N. (J.R.C.).

403. Knot.—Unusually plentiful. On February 29th *c.* 1,200 on Fenham Flats (F.B.). A flock of varying numbers spent about three months on the coast between Whitley Bay and Seaton Sluice, N. The first bird appeared on January 18th and by February 1st there were 60-70, increasing to about 150 by mid-March. It is most unusual to find so many on this part of the coast and feeding on such a rocky shore (H.R.O., F.G.G., etc.). In the autumn a flock appeared at the same place—first seen November 14th, increasing to *c.* 200 by December 12th (H.R.O., D.R.S., etc.).

404/5. Dunlin.—Though birds in breeding plumage were seen inland, no breeding was reported, except on the Upper Teesdale Fells, where several pairs were seen and one nest found (H.W.). On May 13th at Holy Island crossing *c.* 3,000 in summer plumage (F.B.).

406. Curlew-Sandpiper.—Very few reported and usually single birds.

407. Little Stint.—Only three records : September 22nd at Primrose, near Jarrow, D., one (F.G.G.) ; on September 22nd, 23rd and 24th, one feeding with Dunlin and Sanderling on Holy Island (H.R.O.). ; on September 25th, one with other waders on the sands near Seaton Carew, D. (D.S.).

415. Purple Sandpiper.—On January 1st a flock of 30 on rocks near Seaton Sluice (H.R.O.). This flock appeared again in the autumn, first seen there on October 24th, increasing to over 50 in December (H.R.O., D.M.B. and others).

416. Sanderling.—Unusually plentiful all along the coast in spring and some remaining during the summer and autumn. On February 29th on Holy Island sands *c.* 500 (F.B.). On February 1st, on Monkseaton sands, a flock of 30 (F.G.G.). As late as May 24th a flock of 60-70 at Seaton Carew, D. (P.L.H. and K.L.).

417. Ruff.—Not often seen on the spring passage, but a male was seen at Ellington Moor ponds, D. on April 17th (J.R.C.). Many records of autumn passage migrants, chiefly in August, but a few September.

421. Common Sandpiper.—On July 29th at Beadnell, a migratory party of 17 on the Long Nanny burn (S. and J.S.A.).

423. Wood-Sandpiper.—Four records. On May 24th one at Primrose, D., seen at close range with telescope (F.G.G.). August 14th to 20th one on Darlington Sewage Farm, associated with a Green Sandpiper with which it could be compared

(A. and K.B.). August 15th and 16th one at Alnmouth (H.T. and A.E.G.). On August 17th one at Holywell, N. (J.C.C.).

424. Green Sandpiper.—Few reported in the early part of the year, but several during July and August and a few later. ' Prevalent this autumn in the South Shields area from August 4th to September 14th, usually in twos or threes, largest flock eight ' (F.G.G.). Seen regularly throughout the autumn at Darlington Sewage Farm, maximum party seven birds (A. and K.B.) (M.H.R.).

428. British Redshank.—A pair bred on Coquet Island, N., and raised two chicks—the first that the lightkeepers can remember (A.E.G.). On April 10th, on Holy Island sands, several swam buoyantly on a stream, one up-ending several times in a very duck-like manner (F.B.).

432. Greenshank.—More than usual reported, chiefly during August. Unusual dates—March 23rd one at Alnmouth (H.T.). December 20th, one on Holy Island (F.B.).

435. Ringed Plover.—On Coquet Island six pairs hatched off by early May (A.E.G.).

440/441. Golden Plover.—Several members have reported flocks on Newcastle Town Moor ; for the most part feeding on those portions which have been sown with grass since open-cast mining ceased (J.P., J.A.M., etc.). Also noted on other open-cast mining sites in Northumberland (M.W.R.). On November 20th a flock estimated to consist of *c.* 4,000 birds was seen at Jarrow Slakes (B.B.).

444. Grey Plover.—Chiefly single birds reported, but on September 17th at Fenham Flats *c.* 110, of which 25 were black-breasted (H.T.) and on the same place on November 14th a flock of 100 counted (F.B.).

449. Lapwing.—Between April 3rd and May 7th, 18 nests containing eggs were found in a very limited area around Ashington, N., and other pairs were present whose nests were not found. 16 of the nests were in grass fields near water. Many eggs were destroyed, apparently by crows, but a good number of young were seen in July (R.C.). Slight but definite increase in breeding birds as compared with last year near Craster, N. (W.S.C.). More breeding birds between Alnmouth and Newcastle (H.T.). Todburn Steel Farm, Slaley (220 acres)—1945, six pairs bred ; 1946, five pairs ; 1947, none ; 1948, five pairs ; but probably only one bred successfully (A.J.C.). Quite numerous on the moors near Hunstanworth in the Derwent Valley with young in early June (J.E.R.). A young bird was seen to swim across the River Derwent at a point where the stream is about 20 yards wide and the water flowing rapidly. The parent birds were flying close overhead at the time (C.H.).

452. Oystercatcher.—On April 18th a pair was seen mating on the Tyne between Corbridge and Hexham (D.B.). Further up the valley, beyond Haydon Bridge, 19 birds were counted just before the breeding season and later four nests were found with eggs (2/4 cl., 1/3 cl.,1/2 cl.). Only one was on shingle, the others being on ploughed land. Young were reared from the first, but it is feared that those on ploughed land were destroyed (Shaftoe Trust School Nature Club per W.J.). In the nesting season, birds were seen on the shingles of the Aln above Alnwick (E.M.), on the Breamish (J.D.T.), and the Lewis Burn (J.D.T.). A pair again bred on Coquet Island and reared two chicks (A.E.G.). A young bird, ringed at Udny, Aberdeen, on June 9th, 1947, was recovered at Newbiggin, N., 150 miles south, on November 12th, 1947 (*B.B.*, XLI, p. 371).

462. Black Tern.—One, immature, seen over pools behind the breakwater at Teesmouth for about a week until September 14th (J.R.C.) ; seen again on September 18th when the primaries of the left wing were missing, probably having been shot away (D.S.). On September 28th and 29th one seen over a flooded field near Killingworth, N., in immature plumage (D.M.R.C. and M.G.R.). Its arrival coincided with a strong westerly wind.

467. Sandwich Tern.—The Brownsman colony was estimated to consist of *c.* 150 pairs. Another colony, on Longstone End, was even larger, probably about 250 pairs. 146 nestlings were ringed (T.R.G. and A. and R.).

468. Roseate Tern.—Farne Islands—about 13 pairs were present on the Brownsman and some nests were located (T.R.G.). On July 17th a pair was identified with Arctics on the Inner Farne (M.G.R.). ' On July 23rd two nestlings were ringed on the Inner Farne. They were discovered by watching the adult Roseates feeding them. Examination showed that their legs were very dark, in fact almost black, as compared with the near-by Arctic nestlings ; this and the

differently spotted plumage and down (they were about 10 days old) was unmistakable ' (A. and R.).

469. Common Tern.—A few birds were seen on the Longstone and at least one brood of young was discovered ; but the Inner Farne colony, deserted during the war years, has not been re-established (T.R.G.). Teesmouth—a few attempted to breed. On May 30th one nest was found, but later this was robbed (A. and K.B.).

470. Arctic Tern.—It was estimated that nearly 1,000 pairs were present on the Inner Farne alone (T.R.G.). On the Farne Islands 68 nestlings were ringed (T.R.G. and A. and R.). In June a nest was found on the Brownsman containing four eggs. This number is most unusual. Clutches of three eggs have been commoner than usual this season (J.M.C.). A few pairs attempted to breed on the North Northumberland coast, but not in the same place as last year ; on June 5th 12 birds were seen sitting on eggs, but no young were reared (F.B.). Inland—one over Broomlee Lough on July 10th (J.A.M.).

471. Little Tern.—At Teesmouth a few attempted to breed. On May 24th, 13 pairs were counted. No eggs were found (P.L.H. and C.H.F.R.). On the North Northumberland coast a few attempted to breed, but not in the same place as in the previous year. No eggs were found (F.B.).

477. Little Gull.—On October 28th two, and on November 7th one, at Whitburn, all immature (J.R.C.). On December 28th with a S.W. gale, one at Holy Island in first winter plumage (R.P.).

478. Black-headed Gull.—At Linsheeles Lough, N., estimated 500 pairs breeding successfully (J.D.T.). Gulls returned again to the Greencroft ponds, D., only 10 pairs, with inaccessible nests, were able to rear young ; eggs were taken from all the others. At Hurworth Burn Reservoir, D., a nest with eggs was found but afterwards destroyed. No previous record of breeding there (P.L.H.).

482. Herring-Gull.—The Marsden Colony has increased : on July 10th 45 young were counted (F.G.G.) and a total of 53 young were reared—the most in any year since it was founded (J.R.C.).

485. British Lesser Black-backed Gull.—A pair bred on Edmundbyers Common, D. The birds were frequently seen and when the nest was found, in a tussock on boggy ground, it contained two broken egg shells and an addled egg (A.R.H.). This is the first authenticated record for the county.

487. Glaucous Gull.—In early February one was picked up dead and others seen about Hebburn, D. (J.R.C.). On December 14th a first-year bird was seen at Holy Island (R.P.). On the 18th and later, another first-year bird was seen at Seahouses, N. (H.T. and T.F.H.).

488. Iceland Gull.—On March 16th, H.M.S.B. identified a gull of this species at Whiteleas pond near South Shields. When first seen it was perched on an old petrol drum where it could be easily observed at close quarters. He writes : ' I was first attracted by its dead white colour and by the length of its primaries which projected beyond the tail making it appear much slenderer than the Herring Gulls, its legs were pale flesh-colour. It was, of course, an immature bird—I think in its third year. On the wing it looked " sandy " and its flight seemed more buoyant and dipping than that of the commoner gulls. F.G.G. saw it that day and the following morning. The bird continued to frequent the pond and the neighbouring fields for some weeks, so that we both became very familiar with it, having many excellent views. I last saw it on April 29th, but it was reported on later dates. On March 22nd, by a piece of good luck, an immature Glaucous Gull visited the same pond. It was very easy to distinguish it from the Iceland Gull, not only by its size but by its much heavier head and bill and its more soaring flight.' (H.M.S.B. and F.G.G.).

489. Kittiwake.—By February 15th a fair number were back at their nesting sites on Marsden Rock, D. (F.G.G.). On April 24th, 124 were on ledges on Dunstanburgh cliffs (J.M.C.).

Kittiwakes are rarely seen away from the sea, but on May 10th three were seen feeding at the Tyne Bridge, Newcastle (H.T.) and on August 3rd an immature bird was seen in Leazes Park, Newcastle (J.R.C.).

A large autumn movement to the north was witnessed off Whitburn, D. On October 28th, during a nine-hour census *c.* 6,000 were counted while on November 7th 4,260 were counted in eight hours (J.R.C.). On the same day, November 7th, in one and a half hours 1,000 or more passed Hartley, N. (F.G.G.).

On the Farnes, 20 nestlings were ringed (T.R.G.). A nestling, ringed on the Farnes by the late Mrs. T. E. Hodgkin in 1946 was recovered in Bonavista Bay, Newfoundland, on July 21st, 1947. Another, ringed by the late T. R. Goddard on July 13th, 1947, was recovered in the Fogo district, Newfoundland, on November 14th, 1947 ; while a third bird ringed by him on July 14th, 1947, was recovered on the Island of Samsö, Denmark, on October 4th, 1947 (*B.B.*, XLI, p. 374).

491. Great Skua.—On October 28th two were seen off Whitburn (J.R.C.). On November 2nd one off Seaton Sluice, N., put up a small flock of Mallard which was resting on the sea (M.G.R.). On November 7th, the day of the great northerly movement of sea-birds, one was seen flying north off Hartley, N. (F.G.G.).

492. Pomatorhine Skua.—On October 2nd, off Marsden, D., one immature and three others passed south (F.G.G.). On October 28th at Whitburn during a nine-hour census, 49 were counted all flying north, the largest party consisted of eight birds and the next of six ; while on November 7th at the same place, during an eight-hour census, 18 birds flew past all going north (J.R.C.). On the same day, November 7th, during one and a half hours, 13 (five, three and five) passed Crag Point, Hartley, N., flying north with Kittiwakes (F.G.G.).

493. Arctic Skua.—Not so many reported as usual. At Alnmouth first seen July 8th (two), last seen September 19th (one) (H.T.).

496. British Razorbill.—On July 16th some 300 off Alnmouth (H.T.). This is a large number considering how few breed locally.

499. Southern Guillemot.—Of young birds ringed on the Megstone, Farne Islands, on July 23rd, 1948, two were shot on Oslo Fjord, Norway, on October 1st and 24th and a third recovered at Halland, Sweden, on January 8th, 1949 (A. and R.). This proof of a northerly movement in winter is most interesting.

501. Black Guillemot.—On October 23rd three seen flying down Skate Roads off Ross Links, N. (F.G.G.). On the 28th two off Whitburn, D. (J.R.C.).

502. Little Auk.—On February 5th, four at the Farnes (R.S.R.). On October 28th, off Whitburn, four seen (J.R.C.). On November 7th during an eight-hour census, 3,500 were counted all going north : ' One party of 10 flew only two feet above my head as I stood on the rocks ' (J.R.C.). On the same day, November 7th, in Druridge Bay, one, then six seen in flight (R.D.S.) and the next day at Alnmouth at least six were seen flying north (H.T.). On November 17th one was picked up dead on a railway line at Marley Hill, D., 14 miles inland (S.E.C.), and another on the 20th was found dead at Crow Hall Farm, Blagdon Estate, N. (J.W.).

504. Corncrake.—Rather more reported than in previous years. In May birds were heard calling on three different farms near Haydon Bridge (W.J.), and three birds were heard in the Corbridge district (H.R.O.). On June 17th one was heard at Blagdon (J.S.A.). On June 22nd one was heard at Riding Mill (C.J.G.). A pair of birds with two young were seen in a hayfield at Catraw, N. Later three addled eggs were found (M.W.R.). In July two at Hurworth Burn, D. (C.H.F.R.). In July six birds were heard calling between Wearhead and St. John's, D. (J.P.) Several pairs were heard in Upper Teesdale and at hay harvest a nest with seven eggs was found deserted (H.W.). In early September two were flushed at Pity Me, D. (per J.P.). On September 7th a young bird was shot by mistake at Lumley (per Col. T. E. St. Johnston).

505. Spotted Crake.—In October, one seen at Hurworth Burn, D. (J.R.C.).

509. Water-Rail.—Frequently heard and probably breeding at Gosforth Park, but no nest found (K.N.G. and W.R.L.). In November at least six were seen at Blagdon when the water was frozen (M.W.R.). Early in November one was picked up dead in a steel-works near Teesmouth ; it had evidently been killed by flying against a wire (T.S.S.).

510. Moorhen.—A pair bred on the North Wamses, Farne Islands, again this year. Two were still on the outer Farnes on October 30th (R.S.R.).

513. British Black Grouse.—Again very few reported and usually only single birds. Gamekeepers say that they are now breeding higher up on the fells than formerly.

514. British Red Grouse.—After some poor years with much disease, Grouse had a remarkably successful season and a good healthy stock was reared (G.H.).

520. Quail.—One record only. On July 7th one was heard calling in a rough grass field on Hewley Farm, Throckley, N. Later, at hay harvest, farm

workers were questioned but they had not seen or heard any birds (A. and R.).

In *O.R.*, 1947, it was stated that in that year no Quails were heard in County Durham. The following note shows that there was a record : ' On July 10th, 1947, at Sadberge, near Darlington, while a cricket match was in progress, I heard a Quail calling in a neighbouring cornfield. It called repeatedly for a quarter of an hour. As I was batting at the time, I was unable to go in search of it. I am well acquainted with the note of the Quail in Europe and Africa ' (M.H.R.).

Key to the initials occurring in the above Report :—A. and R. = J. S. Ash and M. W. Ridley. M. F. Adams, G. Aikenhead, W. de L. Aitchison, J. Alder, S. Allison, J. S. Ash, S. Ash, A. and K. Baldridge, S. Basham, D. Bell (Miss), N. S. Bennett, H. M. S. Blair, D. M. Boll, F. Brady, B. and F. Brown, J. E. Caffyn, A. J. Clissold, S. E. Cook, R. Cook, J. C. Coulson, J. M. Craster, W. S. Craster, J. R. Crawford, D. M. R. Crombie, J. L. Crosby, I. D. Dougill, R. M. Garnett, C. J. Gent, the late T. R. Goddard, D. Graham, K. N. Green, W. N. Greenwell, C. Greenwell (Miss), A. E. Gregory, F. Gregory, R. Grey (Miss), R. G. Grey, F. G. Grey, G. Hedley, R. Henderson, O. C. Hill, L. P. Hird, T. F. Hird, P. L. Hogg, A. R. Huntley, C. Hutchinson, W. Johnson, G. Kell, R. Kell, H. W. Kerridge, E. Laidlaw, E. M. Lobley (Miss), W. R. Lofthouse, K. Longstaff, R. F. Lyndon, J. A. McGeoch, A. MacRae, R. Martinson, E. Miller, F. J. Nattrass, J. B. Nicholson, H. R. Oliver, W. E. Oliver (Mrs.), J. Payne, R. Perry, A. M. Porteous, C. Potter (Mrs.), F. C. Pybus, E. Reed, J. A. Richardson, M. W. Ridley, M. G. Robinson, N. A. Robinson, J. J. Robson, R. S. Robson, C. H. F. Rowell, M. H. Rowntree, J. E. Ruxton, Col. T. E. St. Johnson, D. Seaward, D. R. Shannon, G. D. Sinclair, T. S. Simmonds, A. Stainthorpe, H. R. Temperley, G. W. Temperley, J. D. Thomson, H. Tully, G. C. Varley, R. O. Varley, F. Wade, J. Walby, T. G. Wallace, J. Walton, H. Watson, G. Watt (Miss), W. A. Wright.

BARNSLEY'S NEW MUNICIPAL MUSEUM

Barnsley Corporation were recently given the Museum of the Barnsley Naturalist and Scientific Society, which represented the labours of enthusiasts in scientific and antiquarian fields since the foundation of the Society in 1867. In handing over the collections the President, Mr. F. Alexander Brown, said the ceremony marked the culmination of many endeavours to form a town's Museum. The Society was the oldest educational institution on the town, and today had upwards of 150 members, of whom 50 were young people.

The Mayor, Ald. H. Burgin, J.P., in accepting the gifts on behalf of the Council said he would always remember his Mayoralty when he thought of this memorable gift. He regretted that the rooms in the Harvey Institute, where it is now housed, were not entirely suitable for a Museum. It was fitting that Mr. E. G. Bayford should take part in the proceedings, and in a graceful speech as he recalled his early days with the Society, he claimed direct connections with the first and present Town Councils.

The Museum itself possesses some very valuable collections. Most of the birds on the British List, and their eggs, are represented, as well as a case of over two hundred foreign birds. The display of freshwater fish superbly mounted in thirty-eight cases are mainly from local waters. There is a complete collection of British land and freshwater shells as well as an extensive display of tropical and marine shells.

Two cabinets house the Brady and Mosley Collections of Lepidoptera, another contains a large herbarium, the work of many local botanists, including Elihu Berry.

The geological collections are very rich in local specimens and comprise a unique series of fossil plants found in the district, sandstone fossils, ammonites and minerals from all parts of the world. Other natural history specimens include examples of British mammals, and marine life forms from the North Sea and elsewhere.

The folk-life section contains examples of the work of old-established local trades such as nail-making, glass-manufacture and linen-weaving, together with coins, tokens, lighting and fireside equipment, early fire insurance plates, the original Bramah fire-engine, parish constables batons, early miners lamps, an armoury of pistols, rifles and powder flasks, as well as many more articles which were once used in the daily lives of our forefathers.

In Memoriam

ROBERT PROCTER
(1915-1949)

Robert Procter died suddenly on Tuesday, March 8th, at New Herrington, Co. Durham, where he had moved with his family, from Leeds, little more than a year ago. Procter was born in Leeds 34 years ago and lived there all his life until his removal. He did not take up the study of lepidoptera until after he had reached manhood, but he followed it keenly and rapidly took a premier place in Yorkshire lepidopterology. In recent years he took up more particularly the neglected micro-lepidoptera, and was making splendid progress in this difficult branch of the subject.

Procter was excellent in the field and took the widest interest in the biology of his favourite group. His friendliness and quiet good humour made him a pleasant companion, and those of us who attended the first excursion of the Entomological Section of the Yorkshire Naturalists' Union to Spurn in June, 1947, have happy recollections of his participation in this excursion. We shall long remember the keenness and enthusiasm with which he joined in all that went forward ; the quiet humour of our evening gatherings at the cottage and the ' sugaring ' and ' light-trap ' work in which we all joined him until early morning.

He was a strong supporter of the Leeds Co-operative Field Club, and was its President in 1945. As far as his work would allow he attended the meetings of the Leeds Naturalists' Club and Scientific Association, and was its recorder for lepidoptera. He was an invaluable worker for the Yorkshire Naturalists' Union, and was the chairman of the Lepidoptera Committee. The Entomological Section of the Union feel his loss very deeply. His collection of lepidoptera has, very appropriately, gone to the Leeds City Museum.

Procter was particularly patient and helpful with young beginners in entomology, and on excursions his readiness and ability to lead and guide them was very noticeable. It is sad indeed when so young a man, scarce embarked on his life-work, is called away. To his wife and daughter our deepest sympathy is tendered in their great sorrow.—W.D.H. and W.A.W.

BOOK REVIEWS

Petrology of the Northampton Ironstone Formation, by **J. H. Taylor.** *Mem. Geol. Survey.* Pp. 111, with seven plates and nine text figs. H.M. Stationery Office, 12/6 ; **Geology of the Northern Pennine Orefield,** Vol. I, by **K. C. Dunham.** *Mem. Geol. Survey.* Pp. 357, with 4 plates and 33 text figs. H.M. Stationery Office, 17/6.

During the war important units of the Geological Survey were directed to inquire into the available mineral resources of this country and, although some of their findings have already been made known in a series of wartime pamphlets, these two volumes represent the first comprehensive accounts of the two subjects under discussion.

Dr. Taylor's memoir is really a sequel to the account of the regional distribution of ironstones in the Northampton orefield which awaits publication, but the important relation between the petrological characters of the ores and the pressing problems of ore-dressing and pre-smelting treatment has led to its earlier appearance. The author describes in great detail the five major groups into which the Northampton Sand Formation is divided. Some of these include rocks known in other British orefields, but certain unique types are mentioned. Twenty-four photomicrographs in colour show the petrological variety among the various ironstones. Perhaps the most interesting section of the volume deals with the way in which, and the extent to which, the mineralogy of the ores controls the pre-smelting concentration which is necessary in low-grade ores. The author reaches the rather disappointing conclusion that the widespread occurrence of chamosite prevents such treatment of a large proportion of the Northampton ores.

Dr. Dunham's volume provides the first comprehensive account of the Lead-Zinc province of the Northern Pennines and covers the area between the Tyne Valley and Stainmore Pass. The rest of the Pennines will be dealt with in a subsequent volume. The control of the location of important orebodies by the rhythmic nature of the sedimentary rocks of the area, by the widespread Whin Sill and by

the distinctive tectonic structures in the area forms the subject of chapters 2-4. Chapter 5 summarises the characters of the deposits themselves, while chapters 6-14 give descriptions of each vein which are encyclopaedic in their detail. The object of the enquiry which has led to this volume was to assess the future prospects of this orefield, from which 3,000,000 tons of lead concentrates and 250,000 of zinc concentrates have been produced. The author concludes that virgin areas exist under the watersheds, but to locate oreshoots at depth is likely to be very speculative. Estimates of reserves of lead and zinc, as well as of the important gangue minerals, fluorspar and barytes are given.

There are more printing errors in the Lead Ore volume than one expects in Survey memoirs, but, these blemishes apart, both volumes will rank as standard works of reference for many years. H. C. V.

Flowers of the Field, by **Rev. C. A. Johns,** edited by **R. A. Blakelock.** Pp. xiv+356, with 96 coloured plates (266 figures) and 245 woodcuts. Routledge and Kegan Paul, 16/-.

Johns' *Flowers of the Field* was first published in 1853. Since then it has passed through numerous editions and it still remains, after nearly a century, one of the most popular and useful books for beginners. Mr. Blakelock's revision has involved considerable alteration to the text of the last edition issued nearly forty years ago. In addition to the numerous changes required to bring the nomenclature up to date, descriptions have been incorporated of the many alien species which have become widely naturalised during the present century, and the introduction has been largely rewritten. The provision of keys to facilitate identifications in the larger families and genera is another very useful addition.

A supplement contains descriptions of all the British species of grasses and sedges, but it seems somewhat illogical to include in a book expressly designed for beginners, descriptions of every indigenous species of these groups when the main body of the work excludes descriptions of many common flowers in groups which are far more likely to arouse the diagnostic curiosity of the beginner. *Viola canina* and *V. stagnina,* for example, are described, but the incomparably more common *V. Riviniana* receives no mention. Apart from the two sorrels, only one dock is described and three others referred to without description, while not a single species of willow is distinguished, the reader being referred to other works for information. Perhaps considerations of the extensive alterations in paging involved did not permit the recasting of these and other genera. No such excuse, however, can be advanced for the failure to bring information as to distribution up to date. *Holosteum umbellatum* is said to grow on old walls in Norfolk and Suffolk. When the original edition was issued this was true enough, but has any living botanist ever met with it there? *Carex ornithopoda* is said to grow in Derbyshire and Yorkshire ; but again, no living botanist has ever met with it in Yorkshire, though it is abundant in some stations in Westmorland. *Carex ericetorum* is also said to occur on chalk hills in the eastern counties, no notice being taken of its recent discoveries in four northern counties. *Primula elatior,* on the other hand, which is confined to East Anglia, is merely referred to as occurring in ' woods and pastures ; not common.' Few botanists have ever seen *Polygala amara* on Cronkley Fell, though very many have seen it in Wharfedale and Airedale; and why perpetuate the old legend that *Menziesia caerulea* has been ' nearly, if not quite, extirpated by an Edinburgh nurseryman,' or that *Arabis ciliata,* an exclusively Irish species with us, also grows in South Wales?

But such errors and omissions are not likely to cause any inconvenience to the beginners for whom the book is intended. The reviewer's task is certainly an easy one compared with that of the editor entrusted with the revision of a book which has earned a place in the affections of so many past and present flower lovers. Mr. Blakelock has rightly been at pains to preserve the distinctive character of the book, and is to be congratulated upon the way in which he has undertaken the difficult task of successfully pouring new wine into an old bottle. W. A. S.

Grasses, Sedges, Rushes and Ferns of the British Isles, by **N. Barrie Hodgson.** Pp. 93 with 17 colour plates. Eyre and Spottiswoode, 9/6.

Mr. Hodgson has apparently written five other books uniform with the present volume and covering the insects, trees and shrubs, freshwater fishes, birds and seashore life of the British Isles. It may well be that he is very knowledgeable

on all these branches of natural history, but he is singularly uninspired on the subject of grasses, rushes, sedges and ferns. The book is a tedious succession of what purport to be descriptions of characteristic features and habitats but which are couched in such wholly inadequate terms as to be practically valueless for purposes of identification. Simple means of differentiating allied species of grasses by reference to their ligules are omitted ; indeed ligules are never even mentioned. Nor do the illustrations compensate for the worthless descriptions. A few are adequate, most are not, and some (*e.g.* the holly fern) are little short of ludicrous. We cannot discover a single merit in this book.

Questions answered about Wild Flowers, by **Cecil G. Trew.** Pp. 109 with 41 illustrations by the author. Jordan & Sons Ltd., 116 Chancery Lane, London, W.C.2, 3/6.

The first part of this pocket-size book deals with elementary facts about form and function in flowering plants expressed as answers to 85 questions. The second part consists of descriptions of the flowers of 20 species selected as representative of their families, each faced by a page of drawings of the flower and its parts. There are numerous errors in the text. Neither the stamens of the poppy nor the petals of the Umbelliferae are joined, the perianth and carpels of the early purple orchid are not inferior and superior nor are its green leaves ' tiny ' ; honeysuckle is not the only member of the Caprifoliaceae native in Britain, nor is *Ornithopus perpusillus* the bird's foot trefoil, and the mistletoe does not grow ' generally on an oak tree ' nor are the leaves of sundew covered with ' hooked, stiff, red bristles.' It is a pity the author is guilty of such careless and false statements as his drawings are clear and accurate and as a first introduction to floral construction the book is not without merit.

The Bee Keeper's Encyclopaedia, by **A. S. C. Deans.** Pp. 190 with 22 photographic illustrations and numerous line drawings. Andrew George Elliot, Glade House, Kingswood, Surrey, 5/- net.

The author is head of the Bee Department, North of Scotland College of Agriculture, and his book is one that will appeal to the prospective bee keeper. There is nothing in it that is new to the experienced bee keeper who has practised the craft for several years and has read widely, but there are several reproductions of excellent photographs which will appeal to all bee keepers. Some of Mr. Deans' home-made appliances are very practical and well illustrated and described. In particular his cage for queen introduction is good, also his method of supplying the bees with drinking water. The book is very reasonably priced and for the beginner or inexperienced it is certainly good value. T.S.B.

Be Quiet and go A-Angling, by **Michael Traherne.** Pp. 200, with woodcuts by D. J. Watkins Pitchford. Lutterworth Press, 8/6.

I was prejudiced against this book at the outset because of its title, which I thought—and still think—rather foolish ; so it was with a sense of duty that I started to read. But the duty soon turned to a mounting pleasure and I parted company with Mr. Traherne on the last page much as one says good-bye to a friend after too short a visit. It is not necessary to be an enthusiastic angler or even an angler at all to enjoy Mr. Traherne. He does not deal with equipment or the technicalities of the sport or set out to instruct, impress or convert his readers. He is the contemplative angler to whom fishing never fails to bring interest and satisfaction, even when it fails to bring fish. There are birds, animals and plants to watch and a rich fund of experience to dwell upon for he has fished for many years and in many waters since his early boyhood when he poached his first trout and made off with it with an irate farmer in hot pursuit. He is no fanatic about this or that style of angling, about the superiority of fly fishing as against coarse fishing, though he naturally has his preferences and especially a strong predilection for carp. The secret of this delightful book is, of course, that Mr. Traherne is every bit as cunning and skilful with his pen as with his rod. He can convey the atmosphere of lazy summer days and nights by leafy ponds and rivers, sometimes uneventful, sometimes thrilling, but never dull or wearisome ; and in recapturing the moods and scenes which have given him so much enjoyment he can also give his reader a generous share of his own pleasure. Mr. Watkins Pitchford's beautiful woodcuts add still futher to the charm of this genial book.

Reed-Warblers : An Introduction to their Breeding-biology, by **P. E. Brown** and **M. G. Davies.** Pp. 127 with 33 plates and maps and diagrams. Foy Publications Ltd., East Molesey, Surrey, 12/6.

Observations begun at a one-acre reed-bed at North Cotes, Lincolnshire, in 1944, were followed by intensive study of which this book is the epitome. If Mr. P. E. Brown had been stationed at an aerodrome to the north of the Humber, it is probable that the line drawn by the authors from the mouth of the Humber to the Mersey, south of which the Reed-Warbler is stated to be common in most suitable localities, would have been drawn from a point sited further north in Yorkshire. Suitable localities are numerous for some distance north of the Humber and most hold Reed-Warblers.

Territory, song, behaviour of the unmated and the mated male, and of the pair are considered, and interesting facts emerge. The females frequently removed all the material of which a partly-built nest was composed and used it to build a fresh nest at an adjacent spot, from which the authors deduce that building material for Reed-Warblers is ' hard to come by.' Certainly, material already collected together would be used more easily than fresh material that had to be sought piece-meal. Might not the fact of discovery of the nest before it was completed make a new site appear desirable to the birds, as occurs not uncommonly with other species ?

The excellent photographs taken by several people also feature interesting phases of behaviour. When, some 20 years ago, I photographed a Reed-Warbler shading its young from direct sunlight, and observed the panting adult lean to one side of the nest and spread a wing upward, I queried if the purpose was to deflect any slight current of air into the cup of the nest. Such behaviour the authors describe as the ' collapse ' of the adult, which I presume was not too complete for quick recovery. I saw nothing that could be called ' collapse.' The photographs are both useful and beautiful, notably plate 18 ; the diagrams of the black, factory-chimney type are only useful.

The authors have made a valuable contribution to monographic ornithological literature which should find a place on all our shelves. R.C.

Predatory Birds of Great Britain, by **Eric Parker.** Pp. 83 with 15 drawings. British Field Sports Society, 51 Victoria Street, S.W.1, 3/-.

The booklet contains brief but sound descriptions of the predatory birds (33 species), with illustrations in some cases. A schedule lists the species and tells the protection afforded—or that should have been afforded—in different areas under the Wild Birds Protection Acts, 1880-1908, revised to 1949 by Miss Phyllis Barclay-Smith. The lack of co-ordination between the various county authorities that have issued lists is obvious ; in Yorkshire we find the Little Owl scheduled for protection throughout the year in the East Riding, and for the periods February 1st to August 11th, and from March 1st to August 11th in the North and West Ridings respectively.

More important than such discrepancies, however, is the fact that many of the gamekeepers for whose guidance the book is prepared, habitually ignore the law, even regarding some birds that theoretically have complete protection. The breeding season, during which many raptores are protected is precisely the season when some such are destroyed. Some of us have for years made the appeal to gamekeepers individually that is now made to them and their employers collectively by Mr. Parker for the B.F.S.S. To many such I have said : ' You keepers are the police of the countryside, of all people you should know and observe the law.' A few have agreed, some have ' hedged,' many did not even know the law ! Kestrel and Merlin, both species of buzzard, all the owls and the three harriers, the Peregrine Falcon and the Osprey, all are scheduled for protection in Yorkshire. The value of the appeal now made will hang on the event, and if effective will certainly add much to the support desired by the B.F.S.S. against the blood-sports abolitionists.

The request to draw public attention to the book is acceded to with pleasure. We hope the appeal will prove effective ; and to it would add that gamekeepers should not only observe the law themselves, but should see that others do the same in the areas under their charge. R.C.

British Butterflies, by **Vere Temple.** Pp. 48 with 8 colour plates and 22 black and white illustrations. Collins, 5/-.

The *Britain in Pictures* books, now numbering well over a hundred titles, are an excellent series. They blend art with authority, good pictures with good prose, reliability with readability ; they are models of good taste. Miss Vere Temple was an obvious choice for the butterfly book now added to the Natural History section. She knows her subject well and is herself an artist of distinction. Two of the colour plates and seven drawings in this collection are her own work, and the text includes many personal observations. Her account covers early literature on butterflies and the origin and distribution of the British species ; and the descriptions of the families and chief species include discussions of problems relating to vision, courtship behaviour, migration and hibernation. This is a book which is assured of a welcome by naturalists in general as much as lepidopterists in particular.

The A.B.C. of Photography, by **Frank** and **Molly Partington.** Pp. 88. The Fountain Press, 3/6.

Properly used the camera is still an almost ideal instrument for illustrating any branch of natural history. Proper use can be learned from a course of lessons given by a suitable professional, or by the intelligent reading of an elementary text-book, or by the slow and wasteful process of trial and error. Here is a small book covering, in simple language, choice and use of camera, treatment of negative and printing therefrom. The book is not written primarily for naturalists, but at a modest price it covers the elementary facts which every photographer needs to know, whatever his subject matter may be. Careful perusal should save beginners, or near beginners, much needless expenditure of material and time.

I Found Happiness : The Happiness of Horse and Rider, by **Jane Munro Gaymer.** Pp. 172, with numerous illustrations by the author. Hollis and Carter, 25 Ashley Place, London, S.W.1, 12/6.

Miss Gaymer took to horses as naturally as a duck takes to water ; and almost as soon, for she was watering stallions at five, and had been riding and looking after her ponies for some years before she wrote this book, the manuscript of which was completed when she was twelve and a half. The book is intended for other girls and boys, and in it she sets down all the necessary instructions on how to saddle, mount and ride, and how to care for the horse or pony in the stable—equipment, feeding, grooming and cleaning, stable management and so forth—all illustrated by her own numerous, clear and capable sketches. It is a remarkable achievement for so youthful an author, written in a simple, direct and thoroughly competent manner. Other youthful enthusiasts will find this book full of helpful information. Few indeed can have Miss Gaymer's width of experience or fail to profit from her instructions.

LEPIDOPTERA COMMITTEE—APPEAL FOR ASSISTANCE

Members of the Lepidoptera Committee will be aware that it is hoped to publish a revision of the Yorkshire List at the earliest opportunity. Such a revision entails a great deal of diligent searching through records and collections, and cannot be accomplished without the whole-hearted support of lepidopterists throughout the county. The collection and subsequent collation of records made since 1904 is a big task, and it is proposed that the work should be undertaken in stages, *i.e.*, work should proceed on parts only of the Lepidoptera List at any one time, and the results published as soon as available.

To this end it is hoped that a start can be made on the first part of the list at once. The groups chosen are the Zeugloptera and Homoneura, as printed in the Check List of Kloet and Hincks (1945), some 19 species only. It is essential that all works of reference, collections both private and communal, and record books whether of individuals or societies should be consulted and notes made.

Volunteers are required from all parts of the county who will be willing to undertake the task of obtaining the records of occurrence or status of these 19 species in their area since 1904. If they will signify their willingness to assist by writing to the Recorder, E. Dearing, B.Sc., 10 Bray Road, Speke, Liverpool, 19, they will be issued with the necessary instructions.

The genera included in the first assignment are Eriocrania, Mnemonica, Micropterix, and Hepialus.

OCTOBER-DECEMBER, No. 831

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The NATURALIST

A QUARTERLY ILLUSTRATED JOURNAL

PRINCIPALLY FOR THE NORTH OF ENGLAND

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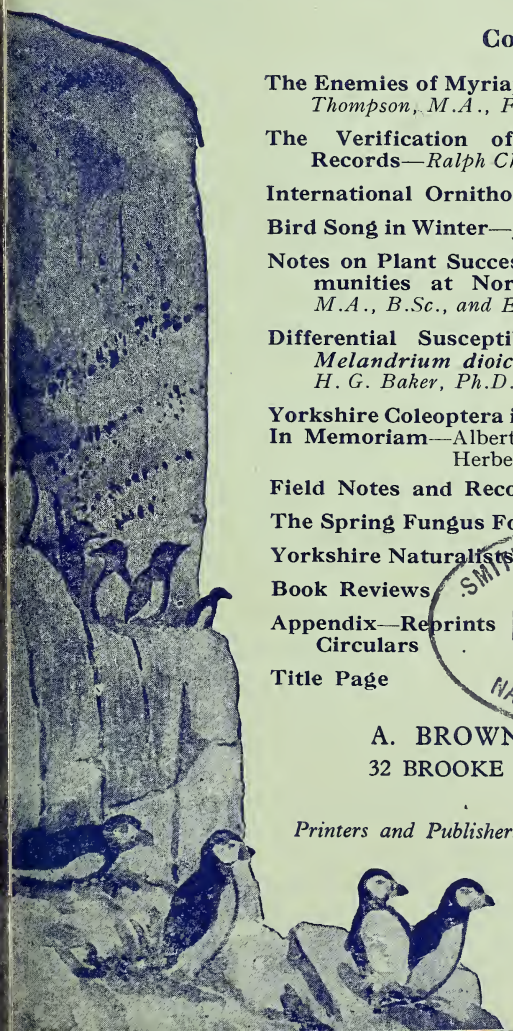

Contents

PAGE

The Enemies of Myriapods—*Capt. J. L. Cloudsley-Thompson, M.A., F.Z.S.* 137-141

The Verification of Ornithological 'Sight' Records—*Ralph Chislett.* 141-142

International Ornithological Congress . . 142

Bird Song in Winter—*J. P. Utley, B.Sc., M.B.O.U.* 143-144

Notes on Plant Succession in Herbaceous Communities at Norwood Green—*H. Tordoff, M.A., B.Sc., and E. Dearing, B.Sc., F.R.E.S.* . 145-147

Differential Susceptibility of Sub-species of *Melandrium dioicum* to attack by Aphidae—*H. G. Baker, Ph.D.* 148

Yorkshire Coleoptera in 1948—*Geo. B. Walsh, B.Sc.* 149-153
In Memoriam—Albert Wilson—*W.A.S.* . . 153-154
Herbert Spencer—*G. F.* . . 154

Field Notes and Records 144, 155-156

The Spring Fungus Foray at Hull—*W. G. Bramley* 157-160

Yorkshire Naturalists' Union Excursions in 1949 161-171

Book Reviews 147, 171-176

Appendix—Reprints of Y.N.U. Excursion Circulars . . . . . i-xxiv

Title Page

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ENTOMOLOGICAL SECTION, LEPIDOPTERA COMMITTEE.

Would all members interested in Lepidoptera please submit a list of species seen or taken in their localities during the past year? Notes upon the status of even the common species would be appreciated. Any notes should be forwarded to the Recorder :—E. DEARING, 10 Bray Road, Speke, Liverpool 19.

SPURN BIRD OBSERVATORY
WARREN COTTAGE LETTINGS FOR 1949

The Committee desire to have the spring (March to late May) and the autumnal (end July to mid-November) migration periods covered completely by competent ringers. Preference will be given to Y.N.U. members as far as possible. Charges continue at the rate of 3/- per night per person. Will those willing and able to take charge for periods please agree them with the Hon. Secretary as early as convenient, giving, if possible, alternative dates and periods? This will enable those who can give time out of the holiday seasons to make their plans and to fill blanks. Visits by those who are not registered ringers, short period and week-end occupation, etc., can then be arranged for other helpers who should also apply early. Visits are often difficult to arrange at short notice. With six occupants the cottage is considered full.

G. H. AINSWORTH (144 Gillshill Road, Hull),
Hon. Secretary.

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THE ENEMIES OF MYRIAPODS

CAPT. J. L. CLOUDSLEY-THOMPSON, M.A., F.Z.S.,
Department of Zoology, University of Cambridge.

DURING the past two years a study has been made of the sensory physiology and ecology of two species of millipedes, *Paradesmus gracilis* (Koch) and *Blaniulus guttulatus* (Bosc), the results of which suggest that suitable conditions of the moisture, texture, and humus in the environment may play an important part in the ecology of these species. This paper represents a brief enquiry regarding the importance of predators and parasites in regulating the density of populations of Myriapods. In addition to works cited, a number of additional references have been given in order to provide as complete a bibliography of the subject as possible. Although every one of these has not been checked, the majority have been seen in original.

PARASITES

SPOROZOA.—The commonest parasites of Myriapods are Gregarinidea. Crawley (1903) found that of 165 *Julus* and *Paraiulus* examined, 158 were parasitised by Gregarines; 26 out of 32 *Polydesmus*, six out of 16 *Lysiopetalum*, and four out of 13 *Lithobius*. The parasites had no seasonal cycle, and all stages were found. No doubt the Julidae were so persistently parasitised on account of their gregarious habit and diet of rotting wood and vegetable matter. *Lysiopetalum* which lives under stones in drier places, and is somewhat solitary, was far less parasitised. After Gregarines, Coccidia are the most numerous parasites of Myriapods. *Paradesmus* does not appear to be much parasitised. It is most probable that a high degree of tolerance has been reached between parasite and host, and I think it is unlikely that the former do any harm.

NEMATODA.—Schubart (1947) states that most of the millipedes investigated from the Amazon were infested by Nematodes of different species. Generally the number did not exceed five, and only in the case of two species were 100 or more parasites counted. There are very few references to the Nematode parasites of Myriapoda, and I have not found many.

ACARI.—The mites found on Myriapods have been reviewed by André (1943). They belong to two ecologically separate groups which are unrelated systematically. In the first which includes Mesostigmata and Acaridae, the Myriapods are used merely for transport (phoresy). The second group, all Mesostigmata, includes more or less intermittent commensals which live freely, not attached to their host, and feed on detritus. Waga (1839) found a multitude of little mites covering the body of a sick *Julus*, but I think it probable that the infestation may have occurred after the animal became too weak to clean itself. According to Trëgárdh (1906), the adults of one species of mite found on Julidae in Natal and Zululand, feed upon the liquid secreted by the ' foramina repugnatoria ' of their host. Mites occur chiefly on the head, front legs, and gonopods whence the Myriapods cannot easily remove them. I have never had a heavy infestation in any of my cultures, and *Paradesmus* does not seem to be parasitised to anything like the same extent as, for example, *Tachypodoiulus niger*. On one occasion I found a very small larval mite apparently attached to the outer wall of the hind-gut of this species.

DIPTERA.—Meyers (1934) has recorded an interesting case of aggressive parasitism of a millipede by a Phorid which battled with a huge black *Julus* for several hours. Thompson (1939) dissected some 300 specimens of *Lithobius* and found no parasites other than two species of Tachinid flies. The average parasitism was only 7·5 per cent., and almost half the parasitised centipedes contained more than one parasite larva. In most cases both parasite larvae died.

PREDATORS

CHILOPODA.—Centipedes are carnivorous, and will eat one another if the opportunity occurs. *Lithobius* must not be overcrowded in captivity, or cannibalism will result, particularly if one of the animals is smaller than the others, or has been injured (Cloudsley-Thompson, 1945). Plateau (1878) found that *Cryptops* ate *Himantarium* overnight, and he believed that Geophilids formed a proportion of

NOV 18 1949

its natural food. I have never known a Chilopod attack a Diplopod, although millipedes feed on their own dead.

Acari.—Gervais (1884) observed a large Gamasid mite seize a Symphylid with its jaws, and carry it rapidly away.

Araneae.—It does not appear likely that Myriapods are eaten to any degree by spiders. Halse (1874-5) placed *Lithobius* and *Geophilus* on the web of *Aranea diadema*, and observed that the centipedes were killed but not eaten. MacIndoo (1910) found that small Myriapods served as food for the Shawnee Cave spider *Troglohyphantes cavernicola*, but here other Arthropods were very scarce. Bristowe (1941) writes : ' So far as my field and laboratory experience goes, centipedes are not attacked by any of the hunting spiders,' and my observations confirm this. Bristowe has seen *Lithobius* overcome and eaten by *Ciniflo similis*, *Theridion tepidariorum*, *T. denticulatum*, *Tegenaria atrica*, *Aranea diadema*, and *Zygiella litterata*. On one occasion I saw *Cryptops hortensis* eaten by an immature *Theridion*, probably *T. denticulatum* which was considerably smaller than its powerful prey. Bristowe remarks : ' Not infrequently I have noticed that the meal is left uncompleted as though the flavour is not particularly agreeable.'

Millipedes are protected by an extremely hard cuticle, and possess the power when disturbed, of exuding repugnatorial fluid from segmentally arranged glands. When a number of *Paradesmus*, for example, are placed together in a small container, a characteristic almond-like odour soon becomes apparent. Bristowe once found *Meta menardi* in a cave, eating a *Polydesmus* ; but in general this genus appears to be unacceptable to spiders, and hunting spiders will not attack it. *Dysdera erythrina* ignores *Paradesmus*, *Blaniulus*, and *Tachypodoiulus niger*. Bristowe saw *Ciniflo similis* refuse *Polydesmus* three times, and *Aranea diadema* either rejected or accepted it with considerable hesitation. Although I found that *Paradesmus* was refused by *Tegenaria atrica*, it was eaten by *Ciniflo similis* and *C. ferox*, along with *Blaniulus* and *Tachypodoiulus*. Bristowe states that *Julus* (presumably he means *Tachypodoiulus*) is accepted with hesitation by *Pholcus*, refused by *Zygiella*, *Meta reticulata*, *Aranea diadema*, *Segestria*, *Dysdera*, *Pisaura*, *Tarentula*, *Drassodes*, and *Xysticus*. The only possible predators in the hot-houses where *Paradesmus* normally lives appear to be *Dysdera*, *Tegenaria*, *Theridion*, and *Aranea* spp., and the jumping spider *Hasarius adansoni*. Of these, the only genera which will ever eat millipedes are *Theridion* and *Aranea*, and these are the two with which they are least likely to come into contact.

Hymenoptera.—On January 18th, 1949, I watched a number of hot-house ants (probably *Monomorium pharaonis*), attacking a small seventh stadium larva of *Paradesmus gracilis*. The millipede, rolled up (spiral reflex), was being dragged vertically up an exposed orchid root by three or four worker ants which gripped its lateral carinae with their mandibles. After a while the millipede uncurled and walked away, but the ants attacked again, and after some fifteen minutes succeeded in dragging it into a mass of roots and humus. I have never seen the remains of millipedes in the nests of this species, and it is well known that millipedes are frequently found as commensals with ants and termites. Nevertheless ants are quite capable of eating a millipede, and millipedes do not visit a baited trap which is infested with ants.

Pisces.—Pearse (1936) records Myriapoda as forming part of the food of young Cenote fishes from Yucatan. I have fed *Tachypodoiulus* and *Paradesmus* to Tench (*Tincta tincta*) and Dace (*Leuciscus leuciscus*), but they were either accepted without enthusiasm or rejected. Even the greedy Stickleback (*Gasterosteus aculeatus*) finally rejected *Blaniulus* after making many furious attacks on it. P. H. T. Hartley, in his exhaustive paper on the Natural History of a number of British fresh-water fishes (1947, *Proc. Zool. Soc. Lond.*, **117**, 129) does not record Myriapoda as forming a proportion of their food ; and investigations of the stomach contents of several other species (published in *J. anim. Ecol.* and elsewhere) show the same thing. It is probable that millipedes infrequently fall into the water and, when they do, are not eaten when other food is available.

Amphibia.—Millipedes form a constant article of diet of the American Toad (*Bufo lentiginosus*), as many as 77 having been found in one stomach, 10 per cent. by bulk of the food of toads being millipedes (Kirkland, 1904). I find that *Bufo vulgaris*, which will eat almost anything it can catch, will readily devour

Paradesmus and *Tachypodoiulus*, but *Lithobius* is too quick and escapes. According to McAtee (1932), Myriapods are also eaten by frogs and salamanders.

Reptilia.—Schubart (1947) records the remains of large Spirostreptidae in two of 22 *Caiman latirostis* killed in the San Francisco River, Brazil. Myriapods are also eaten by lizards, snakes, and turtles (McAtee).

Lithobius was readily accepted by *Lacerta viridis*, and *Paradesmus* was bitten but rejected. When *Tachypodoiulus* was bitten, however, it was violently ejected as though extremely distasteful, the lizards rubbing their mouths in the sand and refusing to approach the millipedes a second time. Some turned back after approaching to within an inch or so, as though repelled by an unpleasant smell.

Aves.—There is little doubt that millipedes are eaten by birds. McAtee (1932), whose figures are probably less misleading than his interpretation of them, states that centipedes have been identified 236 times from the stomachs of 65 species of Nearctic birds, and millipedes 2,598 times from 98 species. The latter were identified more than 50 times in the case of each of 12 species of birds. The highest number of millipedes found in a single stomach, that of a Starling, was 40, and more than one-tenth of the annual food of the Starling in the United States consists of millipedes. Kalmbach and Gabrielson (1921) have pointed out that, so far as is known, no other bird in the United States equals the Starling in the destruction of millipedes. These creatures form 11·71 per cent. of the adult bird's yearly diet. In April they amount to 54·69 per cent. ; in May, 42·19 per cent. ; and in June, 23·66 per cent. ; and after a falling off in the later summer months, they again rise to 7·64 per cent. in October. The fact that in April 119 of 132 adult birds examined, in May 133 of 140, and in June 146 of 215, had fed on millipedes, furnishes an idea of the persistence with which Starlings must search for such food in Spring and Summer. Fifteen of the birds collected in April had taken nothing else, and 14 others had secured over nine-tenths of their food in millipedes. Lindsey (1939) also found that millipedes were eaten a great deal by Starlings in New York State, and Hammond (1912) in this country found that millipedes are eaten by Starlings particularly in March-June. Millipedes comprise a proportion of the food of other birds such as crows, etc., but I have not attempted to survey all the literature regarding the food of birds.

Mammalia.—The stomach of a Brazilian Armadillo (*Dasypus novemcinctus*) was full of segments of two common Leptodesmidae of the Tapirapé, and two *Scolopendra* of 20 cm. length were found in another species (Schubart, 1947). The stomach of a South American Skunk (*Conepatus chilensis amazonicus*) hunted in the Pernambuco State, was likewise full of a species of Spirostreptidae. A long-eared dog (*Otocyon virgatus*) kept by Loveridge (1923) spent a good deal of his time turning over stones in search of millipedes which were gobbled up greedily. On being offered a black and yellow Polydesmid, he pawed it over for some three minutes, but would not eat it. This aposematic form was evidently particularly distasteful. Millipedes are also eaten by the Mole (*Scalopus*), Armadillo (*Tatu*), and Civecat (*Bassariscus*), etc. (McAtee, 1932).

Summary

As far as can be seen, parasites play a negligible part in controlling the density of Myriapod populations. Only two classes parasitise them to an appreciable degree : Acari, which are little more than commensals, and Sporozoa which probably cause little inconvenience to their host.

Predators play a greater part, however, and cannibalism among Chilopoda may help to prevent overcrowding. Although some spiders eat Myriapods, it is found that the species which will accept them as food are chiefly those least likely to come across them in nature. Amphibia and birds are probably the most effective predators. At the same time it is evident that Diplopods are rendered unpalatable by their tough cuticle and irritant exudates secreted by the ' foramina repugnatoria.' Chilopods are poisonous and inject venom through a pore at the apex of their poison-jaws (maxillipeds) in biting : they are possibly somewhat distasteful as well. In most cases predators are far less important than parasites in the control of insects. On the whole there seems little doubt that enemies do not play a very great part in the ecology of Myriapods, whose numbers are chiefly governed by physical conditions in the environment.

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Since writing the above, I have come across some additional references. R. I. Pocock (1893, *Nature, Lond.* 48, 105) mentioned that centipedes such as *Lithobius* and *Geophilus* are included in the food of scorpions. J. H. Fabre (1907, 'Souvenirs Entomologiques,' Sér. 9, 249) fed his scorpions with *Glomeris* and *Julus* ; and describes a combat with *Scolopendra morsitans* (p. 277), in which the giant centipede was killed after a struggle lasting several days. Moreover, it appeared to be *de rigueur* for the scorpion to eat its vanquished enemy, though on such occasions only was such a quantity of food consumed (Warburton, C., 1909, 'Arachnida' *in* Harmer, S. F., and Shipley, A. E., 'The Cambridge Natural History,' **4**, 301.). But, as Millot, J., and Vachon, M. (1949, 'Scorpions' *in* Grassé, P-P. 'Traité de Zoologie, Anatomie, Systématique, Biologie, 6, 425) point out, the big *Scolopendra* often gets the better of its adversary.

F. H. Gravely (1915, *Rec. Indian Mus.*, 11, 425) once saw *Scutigerella* seized by a *Schizomus* (Arachnida, Schizomida), and carried off into a burrow to be eaten.

THE VERIFICATION OF ORNITHOLOGICAL 'SIGHT' RECORDS

RALPH CHISLETT

DURING the period in which I have been responsible for the acceptance or otherwise of ornithological records in Yorkshire, I have striven to live to a standard of accuracy calculated, I have hoped, to make the various items in our reports acceptable anywhere, now and in the future. In this I have been helped immensely by my recording colleagues. Our reports have often included indication of the criteria required. Many of our contributors have learned to conform ; many indeed have not needed to learn. But notes still reach me occasionally that necessitate questions to elicit relevant facts. Sometimes the facts are not forthcoming and reluctantly I have to omit items that would be of importance if properly authenticated. Records may have to be described as 'possible' or 'probable,' or enclosed in square brackets, indicating that in the editor's view an element of doubt remains about them. In these days records long since accepted as completely authentic are being questioned and their value re-assessed.

No one need feel aggrieved if their notes are so treated, and rarely has any shown aggrievement. The recorders practice what they preach. In 1948, when I was fortunate to discover the first nest of the Little Ringed Plover known to have occurred in Northern England, Mr. W. B. Alexander was in 'another part of the field' and F. R. Allison joined us immediately afterwards. Said Alexander to Allison, 'Don't you think his identification of that nest should be corroborated, or is he as editor of bird records in Yorkshire exempt from such formality ?' I

quite agreed that I was in no way exempted from the necessity for confirmation. I had had no previous experience of the species as a breeder and I had long since adumbrated that only those who know a difficult bird well can really identify it, others can only form an opinion. In due course my friends inspected the nest and watched a Little Ringed Plover return to it.

When R. M. Garnett found that an eagle was frequenting an area adjacent to the Vale of Pickering early in 1948, he soon passed the information to trustworthy observers and thereby gave others an opportunity to see the great bird and also obtained the corroboration necessary to establish the bird as an immature White-tailed Eagle. The data he published subsequently contained irrefutable evidence from competent witnesses to a number well beyond the requirements of a court of law.

Whenever the unusual is encountered observers should state clearly how much they saw of the bird, and the diagnostic characteristics which enabled identification to be certain. Wherever possible energetic attempts should be made to get identification verified by someone whose competence is not in doubt. Unusualness may be of several kinds. A Cuckoo in March needs confirmation just as much as a new breeding or visiting species for the county. In recent years cases have occurred of both types of which verification was not secured despite the fact that in one case the bird, at an unusual season, was inhabiting a particular area in which it would have been easy to obtain an expert witness ; and in another case was tied to a particular spot for weeks for breeding purposes. If I, or any of my recording colleagues had had such a case to deal with, we would not have dreamed of passing a record forward which did not make clear the grounds on which diagnosis was based, and we should have obtained reliable corroboration. We appreciate the value of an opportunity for discussion concerning points of difference between related species, with a specimen in view to two or more together. How often have I wished for such an opportunity with a difficult species in view at Spurn !

Pre-knowledge of the slight differences between closely related species is necessary to enable certain identification. Sometimes I have asked for further data concerning such a bird, and when forthcoming they have borne evidence of having been culled from the Handbook subsequent to the event. Human memories are all defective in different degrees and liable to be coloured by what is read afterwards. Details should be entered in the notebook at the time they were seen, not after the return to base.

Even when a bird is found dead a second opinion is frequently valuable. A dead buzzard was found on a Yorkshire estate in June, 1949, and a leg and a wing reached me in such good condition as to suggest that the whole body might have been suitable for preservation. These I diagnosed as having belonged to a Honey Buzzard. Desiring reliable confirmation I asked for it from Mr. Wagstaffe and he duly gave it. I am always glad to consult with another for the sake of certainty, not always necessarily to myself, but to those who will read my records and reports in the near, and distant, future. In the matter of scientific identification we cannot be too cautious or too careful.

INTERNATIONAL ORNITHOLOGICAL CONGRESS

THE Permanent Committee for International Ornithological Congresses has instructed the Ornithological Society of Sweden to organize the 10th international congress. It is to be held at Uppsala on June 10th-17th, 1950.

According to the preliminary programme, the opening of the Congress will take place on Saturday, June 10th, at 2 p.m. Sunday, June 11th, will be devoted to a whole-day excursion ; June 12th-17th to Congress discussions, as well as another whole-day excursion and an afternoon tour. Before and after the Congress, excursions will be arranged to various parts of Sweden.

Ornithologists from all countries are cordially invited to attend. The congress fee is 25 Swedish crowns, and applications should be sent in before the end of February, 1950. Applicants will be furnished with a detailed programme.

At the Congress a few survey lectures will be held by lecturers specially invited. Other members may also lecture or give short announcements.

A preliminary invitation to the Congress will be distributed very soon through representatives in every country, and can also be obtained from the following address : 10th International Ornithological Congress, Uppsala, Sweden.

BIRD SONG IN WINTER

J. P. UTLEY, B.SC., M.B.O.U.

HAS weather any governing influence over the volume of bird song during the winter months? It is a question often asked and about which conflicting views are held. One section avers that birds sing according to the condition of their seasonal physical changes, a kind of sexual stimulus, while others, and many who call themselves just ' bird lovers,' consider that a fine, mild day in winter may cause a bird to sing for pleasure just as a human being may exclaim ' What a lovely day ' and go whistling up the lane.

In order to try and ascertain if there was any definite connection between weather and bird song during the winter months, a careful record was kept each day of outdoor conditions, a note made of every bird song heard and that song qualified as full, broken or attempted. Although the record was commenced on the first day of October that month is not included in the detailed survey which covers November, December, January and February.

October, particularly if fine, may bring a slight resuscitation of song but by the end of the month the ' quiet ' period has commenced. The last song of a summer visitor was heard from a Willow Warbler on the 12th : Skylarks sang right through the month. The Chaffinch was heard on only the first day and the Linnet on the third. The Hedge Sparrow was heard twice, on the 13th and 16th. The Wren was heard at odd times till the 27th, and before the end of the month the Robin was in full song.

It may seem ungrateful to one without whom the winter months would be dull indeed, but that attendant of human habitations, the Robin, will be given rather summary treatment. On 56 out of 120 days the sweetly retrospective song of the Robin was the only one heard and he sang every day of those four dark months, even through the long period of fog at the end of November.

November. The Skylark continued singing on the first two days but on the third the wind veered west and blew at Force 6 when the species went silent. The strong winds continued for four days, but on the 7th they moderated and the Skylark was heard again, the last time for the month. On the same day a Linnet was giving a few short snatches of song, but was not heard again before the end of the year. The 8th-10th were cold and frosty, but on the 11th it became milder with quiet southerly winds ; the Mistle Thrush gave a few phrases and the Wren was quite noisy. The wind was north on the 14th and though it was only Force 1 and the day was mild, the Robin sang alone. On the 15th the wind backed west, Force 1, and a Song Thrush attempted to sing but it could not be said to complete a single phrase. From the 16th to 18th it was cold with a Force 5 south-westerly wind, but on the 19th and 20th with a Force 3 wind from the same quarter the Song Thrush again made attempts to sing. The wind dropped to Force 1 on the 21st and 22nd, and the species successfully accomplished a number of couplets. The 23rd to 30th were frosty and cold and again the Robin held the stage.

December. It was mild on the 3rd, and the Song Thrush did a few repetitions and gave full song on the 4th : at the same time a Mistle Thrush made a few tries to do a bar and a Wren sang merrily. Although it was cold the Song Thrush again sang on the quiet evening of the 7th, and on the 8th a rising Skylark sang a few notes, then gave up. Until the 17th it was cold and inclement but on that day and the next the Song Thrush sang well and again on the 20th though the whole of that day was misty with persistent hoar frost. It is rather singular that day should be chosen by a Blackbird to try and clear his flute from the top of a hawthorn bush. The 21st and 22nd also gave a surprise for on those two days a few Hedge Sparrows were heard to sing *full* song. From the 23rd to the end of the month it was very dull with keen frost and south-east winds, Force 4, and the Robin sang solo.

January. Through 13 days of cold weather with first south-east then north-west winds and a number of days of severe frost, the Robin sang unaccompanied but on the 14th, which was mild, a Mistle Thrush again thought it would be nice to sing but was not very successful, also a Great Tit had a try but his ' saw ' was very rusty. The 17th was cold with a Force 4 north-west wind but both Mistle Thrush and Song Thrush made attempts. For the next three days the wind was west, Force 6, and it was cold, but the Mistle Thrush lived up to his name of ' storm cock ' ; he persisted at intervals each day and on the 21st he burst into

full song. The next three days were frosty and he was quiet, but on the 24th, which was fine with a Force 2 south wind, he started again and kept on through the rest of the month. On the same day I heard broken song from Song Thrush, Blackbird and Hedge Sparrow, while the Wren again sang full. Four foggy days followed, but this cleared on the 29th when the Skylark started again and also the Blue Tit ; the Great Tit and the Hedge Sparrow were now singing full song and the month ended with a number of cheerful notes.

February. The mild opening of the month kept up the chorus, which was joined on the 2nd by the Chaffinch, but he could not finish properly. Mists and keen frosts with south-east winds were recorded on the 5th, 6th and 7th, and there was a very decided falling off, some birds not being heard. The 8th was mild and the day was a ' full song ' rehearsal : even the Yellow Hammer started with *full* song and a neatly executed ' no cheese ' ending. Next day was a great contrast ; excepting Great Tit, Mistle Thrush and Robin, all were silent : it was very dull and frosty with heavy sleet showers. The 10th was bright, milder weather set in and once more some song could be heard throughout the day. Some Linnets gave a few passages on the 17th, and a Greenfinch stuttered a bit. The weather now became cooler but still the song continued. Linnets were heard on the 24th and 25th, but there was no coherent song. On the evening of the 26th the wind reached strong gale force and there was a marked diminution in the amount of song though on the 27th a charm of Goldfinches was discovered in a sheltered hedge and all the males were twittering little phrases. No Skylark was heard during the gale, and by the last day of the month that wind and the added keen frost proved too much for the Blackbirds.

Summary. A small part of the Vale of Mowbray in the North Riding of Yorkshire was the scene of observations : it contained no select bird haunt, very little woodland and was a typically ' cultivated land ' area.

The winter has been exceptionally mild. At no period was the ground ever covered with snow and the times of keen frost were short. There was very little precipitation of any kind. Even so there was practically no bird song, excepting Robins', from the end of October to January 23rd. After that the variety and volume began to increase steadily. On bad days the volume was reduced, particularly on days of strong winds and when it blew from the north and north-east. When a bird has reached full song it may be silent during a few days of rough weather, but when milder conditions prevail it will start again with full song. An open winter may bring birds to full song earlier than would a winter of severe weather, but in this case the physical change heralding the breeding cycle is advanced ; a pair of Robins started nest building on February 13th, and with it the urge to sing because of territory defence and courtship. Some species such as Hedge Sparrow, Thrush and Blackbird will give phrases of song on odd days throughout the winter, probably because they are well fed and feel like singing. In general, the inception of song is due to the seasonal change taking place within the bird, a state which may be advanced or retarded by the condition of the weather and over which the bird has no personal control. The volume of song during the early days certainly appears to be affected by weather conditions but may not this also be attributable to the effect of such weather on the seasonal bird change? There is still scope for intensive study on this question.

Reports from different localities will vary considerably, latitude and topography play a big part in weather conditions, and altitude alone can give rise to big changes in places not very widely separated.

Sand Martins nesting in the Boulder-clay at Filey.—In an old number of *The Naturalist* (1931, 297) reference is made to a band of stoneless laminated clay which occurs about the middle of the boulder-clay. Near Filey Brigg there is an exposure of this light-coloured clay, which is made more conspicuous by the numerous nesting holes of a colony of Sand Martins. Each year they return to bore their holes in this narrow layer of only a foot in thickness, as the texture is so fine, and so afford an easy guide to anyone wishing to find this peculiar band amongst the large mass of normal boulder-clay.—A. J. Wallis.

NOTES ON PLANT SUCCESSION IN HERBACEOUS COMMUNITIES AT NORWOOD GREEN

H. TORDOFF, M.A., B.SC., AND E. DEARING, B.SC., F.R.E.S.

WHILE the specific compositions of plant communities in the West Riding are generally well-known, comparatively little information is available about the stages that occur in their development. This preliminary account records only certain phases in the development of three communities that require much more study if they are to be understood adequately. Succession has been observed in swamp, rock and meadow habitats on a number of comparable sites situated immediately north of Stockhill Bridge, Norwood Green in South West Yorkshire. These sites bear vegetation at various stages of development, so allowing the deduction of the probable course of succession on a single site representative of the series.

SUCCESSION IN SWAMPS

Alluvium derived from non-calcareous Lower Coal Measure Shale is frequently laid down along the course of Wood Fall Beck. This material may be purely comminuted shale or it may contain varying amounts of organic matter, humic clay or clay subsoil. In November, when the stream level is highest, the loss of weight on air-drying such soil from the rooting zone of its vegetation is 45 to 50%. In July, however, soils composed chiefly of shale fragments lose water very rapidly as the stream level subsides ; at such a time the water content falls to 20%. The *p*H of soils of variable physical constitution, as determined by B.D.H. Capillator, ranges from 7·2 to 7·6. Light intensities on the brightest days rarely exceed 50 foot candles.

On freshly deposited alluvial shale banks only 1 to 6 inches above the level of stream the following colonists are commonly found : *Impatiens glandulifera, Geranium Robertianum, Urtica dioica, Cardamine flexuosa, Ranunculus repens, Geum rivale, Claytonia alsinoides*. This community is often quite open with 60-70% of uncolonised space, but this stage is merely transitory and may be passed through in one year after which an almost pure crop of *Impatiens* excludes other species and occupies the previously vacant space.

Where soil formation has taken place, either *in situ* or prior to its transportation by water, a closed community, with little or no uncolonised space develops. The following are the more important constituent species : *Circea lutetiana, Epilobium hirsutum, Stachys sylvatica, Stellaria alsine, Angelica sylvestris, Filipendula ulmaria, Melandrium dioicum, Heracleum Sphondylium, Juncus effusus, Luzula sylvatica*, and *Phalaris arundinacea*.

Although the composition of such a community is relatively constant there are certain variations. Since the community is developed in the shade of oak, sycamore and beech there are variable light intensitives accompanying the different tree canopies which are marked by changes in the proportion of *Phalaris* to the other plants. The greater light intensity gives a greater proportion of *Phalaris*.

The way in which *Phalaris arundinacea* may become the sole occupant of an unshaded swamp site is observable in the plant succession on the silt of the dried-up mill-pond a hundred yards north of Stockhill Bridge. At present only two distinct later stages are recognisable since the process of silting-up is very far advanced. The earlier plant communities, commencing with those of open water, have presumably passed unrecorded.

In those parts where surface streams are still present a 50% ground cover occurs, comprising : *Stellaria alsine, Veronica beccabunga, Cardamine flexuosa, Cardamine pratensis, Mentha aquatica, Ranunculus repens, Melandrium dioicum*, and *Phalaris arundinacea*.

As the level of the site becomes raised by further deposition of silt so the ground becomes drier and surface water either disappears or becomes confined to one or more main drainage channels. On such a site the co-dominants are *Melandrium dioicum* and *Phalaris arundinacea*. It would appear that, as drying-out of the soil proceeds, one or the other of the above species becomes locally dominant, resulting in large patches of one species. No *p*H differences have been discovered between the sites occupied by the two species ; values of *p*H 7·2 to 7·6 are to be found in both.

SUCCESSION ON ROCKS

Fragments of shale and Elland Flags (a sandstone) form the stream bed of Wood Fall Beck, whose catchment is the surrounding pasture and arable land.

The stream water has a *p*H of 7·7 and an oxygen content of 7/100,000 at 18°C. as estimated by a modified form of Miller's method. In such waters the rocks bear a Community of *Oedogonium* spp., *Ulothrix* spp., *Cladophora* spp., and *Vaucheria* spp., that colonises submerged rocks within a few weeks of their exposure to light.

Part of the above stream receives the effluent from the Shelf Sewage Works carrying with it the spores of *Phormidium* spp. from the coke filter-beds. These spores develop on any solid substratum to the exclusion of all other algae, forming a black, lustrous film.

Before the stream passes beneath Stockhill Bridge it is joined by numerous tributaries which flow in narrow gorge-like channels whose walls are inclined at 60 to 90 degrees to the horizontal. These are chiefly formed of shale with innumerable horizontal fissures in which little soil formation occurs. Such sites may be considered under two subdivisions, each being an extreme point on a scale which contains innumerable intermediate points. Shale cliffs whose surfaces are wetted only by rain and/or small amounts of internal drainage water are only slowly colonised by *Pleurococcus* spp., and *Evernia furfuracea*. At the other extreme of the scale are those rocky slopes which are perennially covered by a film of moving water, and which, by virtue of their topographical position, are shielded from the evaporating influence of the sun and wind to varying degrees. On such sites rapid colonisation by a community of the following species is the rule : *Oxalis acetosella, Chrysosplenium oppositifolium, Mnium rostratum, Mnium hornum, Mnium punctatum, Eurhynchium praelongum, Cephalozia bicuspidata*. The community is usually closed ; *Chrysosplenium* may attain a density of 300 stems per square yard at light intensities so low that an exposure of 90 seconds is required to take a close up photograph of the site using a Leica 3B camera.

Succession in Meadows

Under normal grazing the local self-sown meadow is a complex mixture of *Anthoxanthum odoratum, Agrostis stolonifera, Alopecurus pratensis, Dactylis glomerata, Poa annua, Poa pratensis* agg., *Poa trivialis, Lolium perenne, Agropyron repens*. Arable cultivation was the exception rather than the rule in this area before 1939, so that it was probable that the same meadow communities had been maintained for many years on the same sites. With the cessation of grazing local changes became apparent. On dry sites *Deschampsia flexuosa* and *Galium saxatile*, may become dominant, *Galium* commonly growing alone and providing 80% ground cover. On wetter sites *Polygonum bistorta* may exclude other plants. Where the grass has been burnt off *Digitalis purpurea* often thrives. The following table compares the growth of *Digitalis* on burnt and unburnt sites.

Site	*Average Height of Stalk*	*Average No. of Fruits per Stalk*
Unburnt	24 inches	27
Burnt	39·5 inches	38

A later stage in successional change is the spread of *Rubus* spp. This common hedgerow plant can grow 12 or more feet per annum and by means of the facility with which its stolons root can turn a pasture rapidly into a bramble thicket.

In addition to the action of natural processes, cultivation and other human influences have recently been active on a unusual scale as a consequence of the war, clearing sites for colonisation and variously modifying the processes of natural succession. Consequently there were, and are, special needs and opportunities for the study of such phenomena.

While the repetitive recording of succession and environmental conditions associated with them are ideals to be aimed at, the wider use of photography to record the flora of areas undergoing rapid change due to human activity would enable the loss of valuable information to be avoided. Vertical photographs in particular are valuable in allowing the mapping of herbaceous associations at leisure.

It may well be that examination of the records of local Natural History Societies will go a long way towards elaborating the course of succession in areas whose floras have been described on more than one occasion. Whatever the means, the study of plant succession is especially the province of the botanist who is forunate

enough to have at his disposal local material and the guidance of experts in fields other than his own.

Nomenclature follows that of the Check-List of British Vascular Plants issued by the British Ecological Society, 1946.

Film Strip. British Birds No. 2. How to watch birds. Sketches by Roland Green and notes by Hilda Franks. **No. 3. The Sedge-Warbler.** Photographs by Ernest Mytum and notes by Philip E. Brown. Prepared in collaboration with the Royal Society for the Protection of Birds. Produced and marketed by Educational Productions, Ltd., 17 Denbigh Street, London, S.W.1. 15/- each.

The first film strip in this series was reviewed in *The Naturalist*, 1948, 175. The second consists of 19 frames, every drawing on which is clear, accurate and likely to prove useful in lessons on birds. There are many drawings of birds specially arranged for comparison, and feeding habits, flight and so on may be discussed with ease and profit with such good material. There are other frames illustrating heads and feet, and these are up to the same degree of excellence to be expected from such an accomplished artist as Mr. Green.

The notes, however, are far below the standard set by the drawings. Much, or perhaps all, of the introduction could be omitted. The phraseology is vague and often ambiguous. Here are one or two extracts : ' A keen bird watcher will eventually learn to identify many birds.' ' It is interesting to note that there are about 80 species of birds which can be seen during the course of the year in London and hundreds throughout Great Britain.' Among points to note when bird watching appear ' 1. *Size of body* : Big bodied birds are found in wide open spaces—small ones can dart in and out of close bushes.' ' 4. *Eyes*. The bird hunter has eyes at the front—forward looking.' If the writer means ' the hunting bird ' it might have been better to say so. ' 5. Birds' *wings* differ according to what the bird does : some have pointed wings, others have rounded wings.' The notes on individual frames are often quite good, but as, presumably, the notes are intended for the teacher's use, there seems little point in the interpolation of rather weak questions which any teacher of experience would ignore.

There are 31 excellent frames in the film strip dealing with the Sedge-Warbler. In addition to a fine and most complete series of photographs, there are two maps, one showing the European breeding area and the other the probable wintering area of the Sedge-Warbler. As far as it is possible to do so, the remaining 30 frames give a very good picture of the life history of this interesting species. Beginning with nest-building the strip proceeds to show clear photographs of the completed nest, incubation habits of the parent birds, hatching of the eggs, rearing of the young up to the point when, after about a fortnight in the nest, each young bird finally adopts an independent life. The notes are of the greatest possible value, and the keen teacher will be able to present an authoritative complete account of the bird either before or after the necessary work in the field. W.R.G.

The Butterflies and Moths found in the Dover and Deal District of Kent, by **Bernard Embry** and **George H. Youden.** Pp. 61, Buckland Press, Dover, 5/6.

This volume will be received with interest by lepidopterists, and will serve a useful purpose as a guide to all who visit the area. It is also interesting to anyone who may be undertaking a similar work of compilation. The area is covered comprehensively and obviously much labour has gone into the preparation and presentation of the material. As stated in the Foreword there is no precise boundary to the district and there is a certain amount of overlapping with the area covered by the Folkestone List.

It is interesting to read of ' first occurrences ' and of species bearing the names of Deal and Dover as well as to learn that certain specimens have served for illustrations in monumental works such as C. G. Barrett's *Lepidoptera of the British Isles*.

As the authors admit the arrangement in the book is somewhat unfamiliar and one wonders whether it might not have been wiser to adhere to that of a standard popular work. One hopes that the authors will not now rest on their laurels, but will at once attempt to enlarge the scope of the list, possibly by an attempt on the Microlepidoptera. E.D.

DIFFERENTIAL SUSCEPTIBILITY OF SUB-SPECIES OF *MELANDRIUM DIOICUM* TO ATTACK BY APHIDAE

H. G. BAKER, PH.D.

Two well-defined sub-species of *Melandrium dioicum* (L. emend.) Coss. and Germ. are found in the British Isles (Baker, 1947, 1948). The sub-species *villosum* (Compt.) Baker (containing lowland ecotypes) which is characteristic of the species in mainland Britain, possesses stems and leaves sparingly covered with multicellular, eglandular hairs. The sub-species *zetlandicum* (Compt.) Baker (containing coastal ecotypes) which occurs together with sub-species *villosum* in the Shetland Isles and Hebrides, bears thicker leaves which, together with the stems, are densely covered with hairs.

Material of both sub-species is in cultivation in the Experimental Garden of the University of Leeds and in the spring of 1948 showed an interesting difference

in susceptibility to infestation by the aphis *Brachycaudus* (*Anuraphis*) *lychnidis* (L.). Apparently by reason of the mild, dry spring weather this infestation became so severe upon the sub-species *villosum* that 49 out of 60 plants died without reaching the flowering stage. Severe infestation of this type has also been noticed by Professor J. W. H. Harrison. On the other hand, only one plant of the sub-species *zetlandicum* (out of 103) was seriously infested and died. The appearance of a portion of the Experimental Garden in May, 1948, is shown in the photograph kindly taken by Mr. B. Clarke. The dead plants in the third and sixth rows from the left are of the sub-species *villosum* while the other rows contain plants of the sub-species *zetlandicum*, those on the extreme right being in their first year.

The difference in susceptibility may be connected with the density of the hairs on leaves and stems which provided a serious impediment between insect and epidermis in the case of the sub-species *zetlandicum*. Thus it seems that another biological function may be found for epidermal hairs whose capabilities for reducing transpiration (except in moving air) have been depreciated by plant physiologists.

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YORKSHIRE COLEOPTERA IN 1948

GEO. B. WALSH, B.SC.

THE following records have been collated from notes supplied by :

E.W.A. = E. W. Aubrook. T.B.K. = T. B. Kitchen.
E.G.B. = E. G. Bayford. E.J.P. = E. J. Pearce.
J.H.F. = J. H. Flint. W.J.S. = W. J. Sanders.
W.D.H. = W. D. Hincks. G.B.W. = G. B. Walsh.

*=New Vice-County record. †=New County record.
There are 19 new County records and 86 for the Vice-Counties.

†*Cicindela campestris* L. ab. *tatarica* Mannh. (63) Thorne. E.G.B.
Nebria gyllenhali (Schoenh.) (63) Near Holmfirth, 15/10/1947. W.J.S.
**Notiophilus aquaticus* (L.) (63) Deanhead Valley, 26/3/1948. E.W.A.
This is a common and widely distributed species, but there seems to be no earlier record for V.C. 63.
Stenolophus mixtus (Herbst.)
† (63) West Bretton, 25/5/1948. E.W.A.
* (64) Askham Bog. W.D.H.
†*Harpalus* (*S. Ophonus*) *angusticollis* Muell., G. (63) Fenay Beck; Round Wood, Waterloo, 23/4/1948. E.W.A.
Bembidion dentellum (Thunb.) (63) Kaye Wood, 15/5/1948. E.W.A.
B. obliquum Sturm. (64) On wet sandy banks of lake, Golden Acre Park, Leeds, 24/3/1948. J.H.F.
**B. rupestre* (L.) (64) With the last.
B. femoratum Sturm. (64) With the last.
Stomis pumicatus Panz. (63) Cawthorne, —/5/1948. Bretton Park, 25/6/1948. E.W.A.
Feronia cuprea (L.) Very common, Skeffling, 30/9/1948. W.D.H.
F. adstricta (Eschsch.) (63) Near Holmfirth, 5/10/1947. W.J.S.
F. oblongopunctata (Fabr.) (64) Common under moss on tree stumps, Shire Oaks Wood, Tadcaster, 12/4/1948. J.H.F.
Dromius linearis (Oliv.) (63) Dalton, 15/5/1948. E.W.A.
**Oreodytes septentrionalis* (Oliv.) (63) Deanhead Valley, 26/3/1948. E.W.A.
**Hydroporus granularis* (L.) (61) Skipwith Common, 17/5/1948. E.W.A.
H. lepidus (Oliv.) (63) Deanhead Valley, 26/3/1948. E.W.A.
Agabus biguttatus (Oliv.) (63) Storthes Hall, 13/5/1948. E.W.A.
Limnebius truncatellus (Thunb.) (63) Deanhead Valley, 26/3/1948; Bretton Park, 25/6/1948. E.W.A.
**Hydraena britteni* Joy (63) Mirfield, 4/8/1948. E.J.P.
**H. nigrita* Germ. (63) Bretton Park, 25/6/1948. E.W.A.
**H. gracilis* Germ. (63) Kaye Wood, 15/5/1948. Liley Woods, 16/8/1948. E.W.A.
†*Hydrochus brevis* (Herbst.) (61) Skipwith Common, 17/5/1948. E.W.A.
Enochrus coarctatus (Gredl.) (61) Skipwith Common, 17/5/1948. E.W.A.
Berosus affinis Brullé. (61) Skipwith Common, 17/5/1948. E.W.A.
(The only Yorkshire records are from Hull and Spurn.)
**Xylodrepa 4-punctata* (v. Schreb.) (63) Meltham Mills, 11/6/1948. E.W.A.
Taken commonly at Bingley for some years by Mr. J. Wood. W.D.H.
Aclypea opaca (L.) (63) West Bretton, 9/9/1948. E.W.A.
Ptomaphagus subvillosus (Goeze) v. *sericatus* (Chaud.) (63) Ravensknowle. E.W.A.
**Nargus velox* (Spence) (65) Masham, 27/9/1948. W.D.H.
**Choleva jeanneli* Britt. (63) Cawthorne, 8/5/1948. E.W.A.
**Catops nigricans* (Sp.) (63) Fenay Bridge, 2/5/1948. E.W.A.
C. morio (Fabr.) (63) Denby Dale, 4/4/1948. E.W.A. Recorded from Haworth (*Nat.* 1944, 149.)
Anisotoma humeralis (Fabr.) (63) Cawthorne, 8/5/1948. E.W.A. Kaye Wood, 15/5/1948. E.W.A. (65) Masham, 12/10/1947. W.D.H.
A. orbicularis (Herbst.) (63) West Bretton, 4/8/1948. E.W.A.
Agathidium atrum (Payk.) (63) Rockwood, 5/9/1948. E.W.A.
A. varians Beck. (63) Cawthorne, 8/5/1948. E.W.A.

**Neuraphes elongatulus* (Muell., P.W.J.) (63) Deanhead Valley, 26/3/1948. Meltham Mills, 11/6/1948. E.W.A.
**Stenichnus collaris* (Muell., P.W.J.) (63) Kaye Wood, 5/9/1948. E.W.A.
**S. exilis* (Er.) (63) Woodsome, 21/5/1948. West Bretton, 9/9/1948. E.W.A.
**Scydmaenus tarsatus* (Muell., P.W.J.) (63) Fenay Bridge, 2/5/1948. E.W.A.
**Ptenidium nitidum* (Heer) (63) Woodsome, 21/5/1948. E.W.A.
**Ptilium myrmecophilum* (All.) (63) Kaye Wood, 15/5/1948. E.W.A. (The only previous Yorkshire records are from V.C. 62.)
**Ptiliolum kunzei* (Heer) (63) Slaithwaite, 15/4/1948; Boothroyd Wood, 26/9/1948. E.W.A.
**Acrotrichis montandonii* (All.) (63) Woodsome, 21/5/1948. E.W.A.
A. intermedia (Gillm.) (62) Gristhorpe Bay, 3/7/1948. G.B.W.
**A. fratercula* (Matth., A.) (63) Waterloo, 17/3/1948. E.W.A.
†*Ptinella aptera* (Guér.) (63) West Bretton, 4/8/1948. E.W.A.
Scaphidium 4-maculatum Oliv. (63) Storthes Hall, 13/5/1948. E.W.A.
Scaphisoma agaricinum (L.) (63) Storthes Hall, 13/5/1948. E.W.A. Woodsome, 21/5/1948. E.W.A.
**Micropeplus fulvus* Er. (63) Denby Dale, 15/4/1948. E.W.A.
Megarthrus depressus (Payk.) (63) Ravensknowle, 11/4/1948; Fenay Bridge, 2/5/1948. E.W.A.
**M. affinis* Mill. (63) Gawthorpe, 29/3/1948. E.W.A.
Micralymma marinum (Stroem, H.) (62) Gristhorpe Bay, 3/7/1948. T.B.K.
**Carpalimus bilineatus* (Steph.) (63) Gawthorpe, 29/3/1948. E.W.A.
**C. elongatulus* (Er.) (63) Cannon Hall Park, 14/3/1948; Round Wood, Dalton, 18/4/1948. E.W.A.
Oxytelus nitidulus Grav. (63) Kirkburton Tip, 11/4/1948. E.W.A.
**O. complanatus* Er. (63) Ravensknowle, 24/3/1948; Slaithwaite, 15/4/1948. E.W.A.
**Stenus ater* Mann. (63) Waterloo, 22/3/1948. E.W.A.
S. clavicornis (Scop.) (63) Gawthorpe, 29/3/1948. E.W.A.
S. rogeri Kr. (63) West Bretton, 25/3/1948. E.W.A.
**S. canaliculatus* Gyll. (63) West Bretton, 22/5/1948. E.W.A.
**S. vafellus* Er. (63) Ravensknowle, 26/4/1948. E.W.A.
**S. nanus* Steph. (63) Meltham Mills, 11/6/1948. E.W.A.
**S. cicindeloides* (Schal.) (63) Waterloo, 22/3/1948. E.W.A.
**S. pallitarsis* Steph. (63) Waterloo, 17/3/1948. E.W.A.
**S. binotatus* Ljungh. (63) Kaye Wood, 15/5/1948. E.W.A.
S. pubescens Steph. (63) Waterloo, 22/3/1948. E.W.A.
**S. flavipes* Steph. (63) West Bretton, 25/3/1948. E.W.A.
S. nitidiusculus Steph. (63) With the last.
**S. picipennis* Er. (63) Waterloo, 17/3/1948. E.W.A.
**S. bifoveolatus* Gyll. *(63) Waterloo, 22/3/1948. E.W.A. *(64) Askham Bog, 25/7/1947. W.J.S.
**S. aceris* Steph. (63) Fenay Bridge, 2/5/1948. Woodsome, 21/5/1948. E.W.A.
Dianous coerulescens (Gyll.) (63) Kaye Wood, 18/5/1948. E.W.A.
**Rugilus orbiculatus* (Payk.) (63) Kirkburton Tip, 11/4/1948. E.W.A.
**Lithocharis obsoleta* (v. Nord.) (63) West Bretton, 25/3/1948. E.W.A.
**L. ochracea* (Grav.) (63) Slaithwaite, 15/4/1948. E.W.A.
Leptacinus formicetorum Maerk. (63) Kaye Wood, 15/5/1948. E.W.A.
†*Neobisnius prolixus* (Er.) (63) Gunthwaite, 24/4/1948. E.W.A.
Philonthus addendus Sharp. (63) Fenay Bridge, 2/5/1948. E.W.A.
P. sordidus (Grav.) (63) With the last. E.W.A.
**Gabrius spendidulus* Grav. (65) Masham, 11/10/1947. W.D.H.
**G. nigritulus* (Grav.) (63) West Bretton, 25/3/1948. E.W.A.
**G. pennatus* Sharp. (63) Cotley Valley, 9/5/1948. E.W.A.
Staphylinus globulifer Fourcr. (63) Rockwood, 5/9/1948. E.W.A.
Ontholestes tessellatus (Fourcr.) (63) Ravensknowle, 22/5/1948. E.W.A.
Quedius scintillans (Grav.) (63) West Bretton, 25/3/1948. E.W.A.
**Habrocerus capillaricornis* (Grav.) (63) Rockwood, 5/9/1948. E.W.A. (The only previous record for Yorkshire is Scarborough.—R. Lawson.)
**Mycetoporus brunneus* (Marsham) (63) Boothroyd Wood, 26/9/1948. E.W.A.
**Tachyporus macropterus* Steph. (63) Dalton, 3/8/1948. E.W.A. Recorded from Bubwith (61). W.J.F.

**Tachyporus transversalis* Grav. (63) Meltham Mills, 11/6/1948. E.W.A.
Hypocyptus longicornis (Payk.) (63) Deffer Wood, 28/8/1948. E.W.A.
**H. laeviusculus* Mann. (63) With the last. E.W.A.
**Leucoparyphus silphoides* (L.) (63) Ravensknowle, 11/5/1948. E.W.A.
**Gyrophaena gentilis* Er. (65) Masham, 11/10/1947. W.D.H.
**G. fasciata* (Marsh.) (63) West Bretton, 7/10/1948. E.W.A.
G. angustata Steph. (63) Emley Moor, 5/9/1948. E.W.A.
†*Agaricochara latissima* (Steph.) (63) Cawthorne, 3/10/1948. E.W.A. (65) Masham, 13/10/1947. W.D.H.
**Thectura cuspidata* (Er.) *(63) Gawthorpe, 29/3/1948. E.W.A. *(65) Masham, 18/10/1947. W.D.H.
Bolitochara obliqua Er. (63) Storthes Hall, 13/5/1948. E.W.A.
Autalia impressa (Oliv.) (63) Boothroyd Wood, 11/9/1948. E.W.A.
A. rivularis (Grav.) (63) Dalton, 15/4/1948; Woodsome, 21/5/1948. E.W.A.
†*Tachyusa coarctata* Er. (63) Kaye Wood, 15/5/1948. E.W.A. (det. H. Britten.)
**Gnypeta carbonaria* (Mann.) (63) Waterloo, 22/3/1948; Gunthwaite, 24/4/1948. E.W.A.
**Amischa analis* (Grav.) (63) Waterloo, 22/3/1948. E.W.A.
Notothecta flavipes (Grav.) (63) Kaye Wood, 15/5/1948. E.W.A.
**N. anceps* (Er.) (63) With the last. (The only Yorkshire records are from the Scarborough district.)
Atheta (*Aloconota*) *insecta* (Thoms., C. G.) (63) Cannon Hall Park, 14/3/1948. E.W.A.
**A.* (*Microdota*) *amicula* (Steph.) (63) Dalton, 19/3/1948. E.W.A.
†*A. coriaria* (Kr.) (63) Emley Moor, 5/9/1948. E.W.A.
**A. triangulum* (Kr.) (63) Dalton, 19/3/1948. E.W.A.
A. (*Amidobia*) *talpa* (Heer) (63) Kaye Wood, 15/5/1948. E.W.A.
**Tinotus morion* (Grav.) (63) Liley Wood, 16/8/1948. E.W.A.
Phloeopora testacea (Mann.) (63) Cawthorne, 1/8/1948. E.W.A.
Calodera aethiops (Grav.) (63) Storthes Hall, 13/5/1948. E.W.A.
†*C. uliginosa* Er. (63) West Bretton, 25/3/1948. E.W.A. (det. H. Britten.)
**Chilopora longitarsis* (Er.) (63) Kaye Wood, 15/5/1948. E.W.A.
**Oxypoda opaca* (Grav.) (63) Kirkheaton, 15/5/1948. E.W.A.
**O. sericea* Heer. (63) Dalton, 22/3/1948; Kirkheaton, 17/5/1948. E.W.A. (The only previous Yorkshire record is Whitby (62).—H.B.)
O. formiceticola Maerk. (63) Kaye Wood, 15/5/1948. E.W.A.
†*Euplectus nanus* (Reich.) (63) Rockwood, 5/9/1948. E.W.A.
E. sanguineus Denny (63) Rockwood, 5/9/1948; West Bretton, 25/3/1948. (65) Masham, 11/10/1947. W.D.H. (det. E.J.P.)
Brachygluta fossulata (Reich.) (63) Bentley Spring, 7/10/1948. E.W.A.
Bryaxis puncticollis Denny (63) Among *Hypnum* in a swamp, Mirfield, West Bretton, 4/8/1948. E.W.A.
**B. burrelli* Denny (63) Kirklees Estate, Mirfield. E.J.P.
**Tychus niger* (Payk.) (63) Dalton, 15/5/1948. E.W.A.
Onthophilus striatus (Forst.) (63) Shelley, 19/6/1948. E.W.A.
**Microlomalus flavicornis* (Herbst.) (63) Bentley Spring, 7/10/1948. E.W.A. (The only other Yorkshire record is Scarborough (62).—R.L.)
Hister cadaverinus Hoffm., J. J. (63) Ravensknowle, 11/5/1948. E.W.A.
†*Cantharis cryptica* Ashe (63) Waterloo, 9/6/1948; Bretton Park, 25/6/1948. E.W.A.
†*Tarsostenus univittatus* (Rossi) (63) Milnsbridge, 21/7/1948. E. F. Gilmour.
Corymbites cupreus (Fabr.) and var. *aeruginosus* (F.) (62) Gristhorpe Bay. G.B.W.
Melasis buprestoides (L.) (63) Kirklees, 20/7/1948. E.W.A.
Cyphon paykulli Guér. (63) West Bretton, 22/5/1948. E.W.A.
Attagenus pellio (L.) (63) Cawthorne, 8/5/1948. E.W.A.
**Kateretes pedicularius* (L.) (61) Skipwith Common, 29/9/1948. W.D.H.
Carpophilus sexpustulatus (Fabr.) (63 or 64) Shipley, 27/6/1948. E.W.A.
Omosita discoidea (Fabr.) (63) Kirkburton Tip, 11/4/1948. E.W.A.
O. colon (L.) (63) Slaithwaite, 15/4/1948. E.W.A.
Epuraea unicolor (Oliv.) (63) Denby Dale, 25/4/1948. E.W.A.
**Pocadius ferrugineus* (Fabr.) (65) Swinton Park, Masham, 11/10/1947; in *Lycoperdon pyriforme*, 27/9/1948. W.D.H.

Librodor 4-guttatus (Fabr.) (63 or 64) Shipley, 27/6/1948. E.W.A.
**Monotoma conicicollis* (Aubé) (63) Kaye Wood, 15/5/1948. E.W.A.
Triplax aenea (Schal.) (63) Melton Mills, 11/6/1948. E.W.A.
Dacne bipustulatus (Thunb.) (63) Woodsome, 21/5/1948. E.W.A.
Cryptophagus pubescens Sturm (63) Birkby, 4/9/1948. E.W.A.
C. scutellatus Newm. (63) West Bretton, 25/3/1948. E.W.A.
C. acutangulus Gyll. (63) Dalton, 5/8/1948. E.W.A.
Atomaria mesomelaena (Herbst.) (63) Waterloo, 22/3/1948. E.W.A.
**A. bicolor* Er. (63) Round Wood, Waterloo, 18/4/1948. E.W.A.
**A. linearis* Er. (63) Round Wood, Waterloo, 18/4/1948. E.W.A.
†*A. fuscicollis* Mann. (63) West Bretton, 25/3/1948; near Storthes Hall, 26/9/1948. E.W.A.
†*Enicmus consimilis* Mann. (61) Skipwith Common, 17/5/1948. E.W.A.
**Enicmus histrio* Joy (63) Gawthorpe, 29/3/1948; Woodsome, 21/5/1948. E.W.A.
**E. testaceus* (Steph.) (63) Cawthorne, 8/5/1948. E.W.A.
Pseudotriphyllus suturalis (Fabr.) (63) Emley Moor, 5/9/1948. E.W.A.
Litargus connexus (Geoffr.) (63) Cawthorne, 1/8/1948. E.W.A.
Mycetophagus 4-pustulatus (L.) (63) Bretton Park, 25/6/1948. E.W.A.
M. multipunctatus (Fabr.) (61) Skipwith Common, 17/5/1948. E.W.A.
Typhaea stercorea (L.) (63) Denby Dale, 25/4/1948. E.W.A.
†*Bitoma crenata* (Fabr.) (63) Thorne. W. Bunting.
**Cerylon histeroides* (Fabr.) (65) Masham, 18/10/1947. W.D.H.
C. ferrugineum Steph. (63) West Bretton, 25/5/1948. E.W.A.
Mycetaea hirta (Marsh.) (63) At several localities in the Huddersfield area. E.W.A.
Subcoccinella 24-punctata Guér. (62) Gristhorpe Bay, 3/7/1948. G.B.W.
**Scymnus auritus* Thunb. (61) One quite black specimen from Skipwith, 17/5/1948. W.D.H.
Synharmonia conglobata (L.) (63) Bretton Park, 25/6/1948. E.W.A.
Thea 22-punctata (L.) (63) Coxley Valley, 9/5/1948. E.W.A.
**Aspidiphorus orbiculatus* (Gyll.) (63) West Bretton, 4/8/1948. E.W.A.
**Cis bidentatus* (Oliv.) (65) Masham, 11/10/1947. W.D.H.
**C. festivus* Gyll. (63) Shipley, 27/6/1948. E.W.A.
**Enneathron cornutum* (Gyll.) (61) Skipwith Common, 17/5/1948. E.W.A.
Xestobium rufovillosum (Deg.) (64) Abundant in a dry oak stump, Tadcaster, 7/5/1948. J.H.F.
Ptilinus pectinicornis (L.) (63) Ravensknowle, 17/6/1948. E.W.A.
Nacerdes melanura (L.) Mr. E. G. Bayford writes: 'From Mr. A. Smith of York I have received a number of specimens so entirely different from those I used to take commonly at Spurn that I am doubtful as to their being this species. They appear to agree with the description of *N. italica* Chev. ab. *sardea* Schm. which I have not seen.'
Oedemera virescens (L.) (62) Three specimens from Rievaulx and Old Byland, 30/5/1948. W.L. Taken on several occasions near Helmsley in 1934 and later years. G.B.W. (Y.C.C., 1934.)
Rhinosimus ruficollis (L.) (63) Bentley Spring, 7/10/1948. E.W.A.
Orchesia micans (Panz.) (63) Dalton, 22/6/1948. E.W.A.
**O. undulata*. (61) Skipwith Common, 17/5/1948. E.W.A.
**Hypophloeus bicolor* (Oliv.) (63) West Bretton, 22/5/1948. E.W.A. (Only previous records are Scarborough and York.)
Trox scaber (L.) (63) Slaithwaite, 15/4/1948; Denby Dale, 25/4/1948. E.W.A.
**Tetropium gabrieli* Weise (63) In packing case at Skelmanthorpe, 14/5/1948; Cawthorne, in yard with local timber, 1/8/1948. E.W.A.
Aromia moschata (L.) (64) A single specimen in Askham Bog, 26/6/1948. C. Large *fide* J.H.F
Chrysolina varians (Schall.) (65) Hackfall, Masham, 26/9/1948. W.D.H.
Phytodecta pallida (L.) (65) With the last.
Galerucella nymphaeae (L.) (63) Gunthwaite, 24/4/1948. E.W.A.
Phyllotreta tetrastigma (Com.) (63) Bretton Park, 25/6/1948. E.W.A.
**P. flexuosa* (Ill.) (65) Masham, 17/10/1947. W.D.H.

†*Aphthona euphorbiae* (Schr.) (61) Common on Skipwith Common, 17/5/1948. W.D.H. *Stephens' Manual*, p. 292, reports this from New Walk, York, but this record refers to *A. venustula*. Spurn. W.D.H. (*Nat.*, 1946, 160.)
Mantura rustica L. (63) Cotley Valley, 9/5/1948 ; Storthes Hall, 13/5/1948. E.W.A.
†*Chaetocnema confusa* Boh. (61) One specimen, Skipwith, 17/5/1948. W.D.H.
Apteropeda globosa (Ill.) (62) Gristhorpe Bay, 3/7/1948. G.B.W.
**Psylliodes cuprea* (Koch) (65) Masham, 19/10/1947. W.D.H.
P. napi (Fabr.) (65) Masham, 14/10/1947. W.D.H.
Liophloeus tessulatus (Muell., O. F.) (63) Storthes Hall, 13/5/1948. E.W.A.
**Strophosomus retusus* (Marsham) (63) Emley Mill, 9/9/1948. E.W.A.
Barynotus moerens (Fabr.) (63) Storthes Hall, 13/5/1948. E.W.A.
**Tropiphorus tomentosus* (Marsham) (63) With the last.
**Tanysphyrus lemnae* (Payk.) (63) Lockwood, at light, —/8/1948. B. Senior.
Coeliodes rubicundus (Herbst.) (63) Cotley Valley, 9/5/1948. E.W.A.
**Phytobius 4-tuberculatus* (Fabr.) (63) Round Wood, Waterloo, 18/4/1948. E.W.A.
Scolytus scolytus (Fabr.) (63) Cawthorne, 1/8/1948. E.W.A.
Hylesinus crenatus (Fabr.) (63) Woodsome, 21/5/1948 ; Bretton Park, 25/6/1948. E.W.A.
H. fraxini (Panz.) (63) Storthes Hall, 13/5/1948. E.W.A.
Dryocoetes villosus (Fabr.) (63) Shepley, 27/6/1948 ; Bentley Spring, 7/10/1948. E.W.A.
Pityogenes bidentatus (Herbst.) (63) Cawthorne, 1/8/1948. E.W.A.
†*Ips sexdentatus* (Boern.) (63) Cawthorne, 1/8/1948. E.W.A.
Anisandrus dispar (Fabr.) (63) Thorne. W. Bunting.

In Memoriam

ALBERT WILSON, F.L.S., F.R.Met.S.
(1862-1949).

Albert Wilson was born on October 12th, 1862, at Calder Mount, near Garstang, Lancashire. His father was descended from quaker ancestors who lived at Thornton-in-Craven : his mother came from a quaker family in Essex. He was educated at Stramongate School, Kendal, and at another quaker boarding school at Hitchen. After leaving school in the summer of 1879 he became apprenticed to the firm of Harrison, Parkinson and Co., Pharmaceutical Chemists, of Bradford, and later he became a partner in the firm. From 1897 to 1912 he resided at Ilkley and travelled to and from business in Bradford. In his fiftieth year he retired from business and removed to his old home near Garstang, where his mother required help. After her death in 1916 he moved to Bentham and two years later to Sedbergh. In 1924 he left Sedbergh and went to live at Ro Wen, near Conway, Carnarvonshire, where he remained until 1946. His wife, Alice Mary Thorpe, of Hull, whom he married in 1890, died in 1945, and at the beginning of 1947 he moved north again with his son to Priest Hutton, near Carnforth, where he remained until his death after a long illness on May 15th, 1949. He leaves one son, to whom I am indebted for these biographical details, and a brother.

Albert Wilson first became interested in field botany and began to make a collection of dried plants whilst he was at school in Kendal. One of his earliest discoveries of importance was made in 1887 when, with J. B. Foggitt, he found *Cirsium acaule* at Rievaulx, a discovery which considerably extended the northernmost limit of its then known distribution in England. Dr. F. A. Lees to whose *Flora of West Yorkshire*, published in 1888, Wilson was the last surviving original subscriber, recorded the discovery in this journal (September, 1887, 273). During the years spent in business he devoted much of his spare time to field botany and he had a good knowledge of the flora of the Yorkshire dales. But his main botanical interests at that time were in his native county and he was never an active member of the Bradford Naturalists or the Yorkshire Naturalists' Union. He had made the acquaintance of John Alfred Wheldon, of Liverpool, about the time he came to live in Ilkley, and their common interests led to a close friendship which endured

until Wheldon's death in 1924. Together they worked at the *Flora of West Lancashire* which was published in 1907. They also made joint excursions in Scotland, the Isle of Man, Westmorland and elsewhere. Both of them had wide interests in systematic botany. Mosses, hepatics and lichens as well as flowering plants and ferns were all assiduously collected and studied, and together they contributed a paper to the *Journal of Botany* in 1915 on ' The Lichens of Perthshire.' Albert Wilson was one of the earliest members of the British Bryological Society, and for many years he contributed beautifully-prepared specimens to the annual exchange of the Botanical Society and Exchange Club of the British Isles. He was always very fond of walking, especially on the hills and mountains, and two years ago, when nearly 85 years old, he climbed to the summit of Ingleborough.

Whilst residing at Sedbergh, Wilson made many interesting records on the local flora and contributed papers to *The Naturalist* (1922, 397-398 ; 1924, 48-50) on his discoveries in that district. Both then and in earlier years he accumulated notes on Westmorland plants, but it was not until 1932, after his removal to North Wales, that he decided to write a Flora of that county. It says much for his physical and intellectual vigour that such a work should have been contemplated when he had already reached the allotted span. Yet during the succeeding six years he worked hard at his project in the field as well as the study, paying many visits to the county and conducting a wide correspondence ; and he had the satisfaction of seeing his work in print before the outbreak of the war. This book, like its predecessor dealing with the West Lancashire flora is notable for the many beautiful photographs (mostly the work of his son) which it contains. There is also a charming photograph of the author himself at work in his study. With characteristic modesty this is inserted at the end of the book and omitted from the tabulated list of illustrations.

Apart from his interest in botany, Albert Wilson was keenly interested in meteorology and for many years he kept daily records of temperature and rainfall. The two interests found a joint expression in his important paper on ' The Altitudinal Ranges of British Plants ' published in the *North-Western Naturalist* in 1931 with a supplement in 1940. He also wrote for that journal a ' Flora of a Portion of North-East Carnarvonshire,' published in 1946-47. This contains some notable records of discoveries made by him, *Dryas* and *Carex capillaris* being two of the most interesting. Another very interesting Welsh discovery made in 1927 was *Stachys alpina* which he found in Denbigh. Elsewhere in Britain it is known only in Gloucestershire.

I never met Albert Wilson, though we exchanged many letters at the time he was working on his Westmorland Flora. As a correspondent he was most punctilious and though he rarely strayed beyond botanical matters, I formed an impression of a man whose character was in keeping with his beautiful handwriting.

A few years before his death he gave his herbarium to the Yorkshire Museum, York.

W.A.S.

HERBERT SPENCER

(1884-1949)

Mr. Herbert Spencer passed away in his sleep at Addenbrookes Hospital, Cambridge, after a short illness, at the age of 65 years. He was interred in Royston Church Cemetery on 25th August.

A keen entomologist and ornithologist, Mr. Spencer had lived most of his life at Elland and had formed one of the finest collections of lepidoptera in the county. He retired in October, 1948, going to live with his brother at Royston, Herts., there to continue his interest in entomology and ornithology. He was a naturalist of the old school, with a great range of information about insect life, and an unflagging enthusiasm for natural history in all its branches as anyone who has had the pleasure of accompanying him in the field can testify. His death cut short what promised to be a period of intense pleasure devoted to his beloved hobby, and leaves a considerable gap in the ranks of Yorkshire entomology.

G.F.

FIELD NOTES AND RECORDS

Vegetative versus Sexual Reproduction in *Primula vulgaris* Hudson.—The common Primrose usually grows in clumps, each containing from a few up to a large number of plants, all of which have arisen by vegetative reproduction from a single plant. This is proved by the fact that each clump consists entirely of pin-eyed or thrum-eyed flowering plants, and never of both ; at least in my experience there is no exception to this rule. The size of each clump varies considerably, and this may well be a guide to its probable age ; some clumps with only two or three flowering stems are probably only a few years old, whilst other clumps with several dozen flowering stems may well be very much older. The size of a clump, too, varies from one locality to another even in the same district ; it may depend on several factors, not the least of which may be human interference. The average distance between the centre of one clump and that of the next also varies greatly ; so that the clumps may be spaced widely apart, or so closely that it is impossible to walk among the plants without treading upon them.

We have, therefore, two variables to consider : (*a*) the average number of flowering stems in each clump, which will be roughly proportional to the average area of each clump, and (*b*) the average number of clumps in any given superficial area. Even a rough estimate of these two numbers may suggest interesting conclusions. For example, when the clumps are large and spaced rather widely apart, it is evident that vegetative reproduction has been more effective than sexual, even although the flowers may have been visited by insects, and a large proportion of them may have set good seed. In parts of eastern Swaledale, at least, this situation seems to be the rule.

Acknowledgment is due to Miss R. E. Dowling for some useful information and to Mr. F. A. Sowter for his interest.—G. F. HORSLEY.

***Deyeuxia neglecta* (Ehrh.) Kunth, in Yorkshire.**—Mr. E. J. Douglas sent me specimens of this grass in July collected at Tarn Moss, Malham. Earlier in the summer his attention had been drawn to it by Mr. David Coombe who had suspected from its vegetative characters that it might prove to be a *Calamagrostis*, no species of which was known to grow on Tarn Moss. The plants were growing in *Phragmites* swamp with a few scattered willow bushes near the inflow stream to the Tarn, the habitat agreeing closely with that of its other recorded localities.

Deyeuxia (*Calamagrostis*) *neglecta* is known from several stations in West Norfolk ; from Oakmere in Cheshire ; Loch Tay, Perthshire ; and from Caithness. I am informed that it has recently been re-found in the Forfarshire station where it was first discovered in Britain in 1810. It has also been recorded from North-east Yorkshire, the basis for this record being a sheet in F. J. Hanbury's herbarium collected by H. Ibbotson in July, 1844, and labelled '*Arundo Calamagrostis*, Castle Howard Woods, York.' This gathering was identified as *Deyeuxia neglecta* by A. Bennett and a note thereon published in *The Naturalist*, 1877, 201. Later in the same volume (p. 273) Dr. Lees threw doubt upon the origin of these specimens. In another note by A. Bennett (*loc. cit.* 1915, 95) a letter by Dr. R. Spruce to M. B. Slater dated August 2nd, 1887, is quoted in which detailed directions are given as to the exact situation where Ibbotson had gathered his specimens and where Spruce himself had seen the plant in his younger days. He adds that ' I had called it in my boyhood *C. lanceolata* (for I found no *C. stricta* in Smith's Compendium), but when Ibbotson was here last he told me Jas. Backhouse and (I think) Asa Gray had made it out to be the true *C. stricta*. The plant was still in some abundance when Ibbotson passed this way, and gathered some of it ; but for the last three years there has been a mania for draining on this estate, and it may have extended to the locality of the *Calamagrostis* (which the gods forefend).' As the directions given in Spruce's letter are so explicit it is desirable that this locality should be reinvestigated.—W. A. SLEDGE.

***Rynchospora alba* (L.) Vahl. at Helwith Moss.**—Mr. Cheetham and I on a visit to this locality near Austwick found *Rynchospora alba* in fair quantity. It was spread over several square yards of what would usually be a very wet part of the Moss. The plant has evidently not been detected before owing to the inaccessibility of the site under more normal weather conditions.—JOAN APPLEYARD.

[This interesting discovery reinstates *Rynchospora* in the flora of West Yorkshire. It has not been seen for many years in any of its few recorded localities.—ED.]

***Calypogeia Meylanii* Buch. new to Yorkshire.**—At the Harrogate meeting of the Y.N.U. I collected in Picking Gill on the 5th June, 1949, a *Calypogeia* which I at first took to be *C. Neesiana* (Massal. & Carest.) K. Müll., but which Dr. E. W. Jones has kindly determined as *C. Meylanii* Buch. This species has not previously been recorded from Yorkshire, this being due to the fact that *C. Meylanii* has only recently been separated from *C. Neesiana* sens. str., the two species having been previously confused. *C. Meylanii* Buch. is synonymous with *C. Neesiana* (Massal. & Carest.) K. Müll. var. *laxa* Meylan. I would refer those requiring further information on the characteristics dividing the two species to Richards, P. W. : *Calypogeia Meylanii* Buch., new to Britain, *Trans. Brit. Bryol. Soc.*, 1, 1, 17-18, 1947.—R. Lewis.

An Alga New to Science found at Aysgarth.—In May 1931 I found an alga in a pool just below the lower falls at Aysgarth on the Whitsuntide excursion of the Y.N.U. The material was sent to Prof. F. E. Fritsch, F.R.S. and after a long delay due to a curious chain of circumstances, he has now published a full scientific description of it and named it *Mougeotia Smithii*, the specific name after its finder.

The paper is entitled "Contributions to our Knowledge of British Algae" and the description of the species now under notice is No. IX of a series under that heading. The reference is *Hydrobiologia* 1, 2, 1949.

This new species is of course an addition to the alga flora of both Great Britain and Yorkshire, and so far is only known from the single locality which I have named. It will be interesting to algologists, who can now read the full description of the species, to find out whether it is more widely distributed than in the single locality in which it has so far been found.—A. Malins Smith.

Animal and Plant Introductions in the Thorne District.—I wish to notify that I have introduced the following into various localities :

Rana esculenta (The Edible Frog). Six pairs taken from Ham, nr. Teddington, introduced into suitable waters near Thorne.

R. ridibunda (The Marsh or Laughing Frog). Eight pairs, taken from around Appledore and Romney, Kent. Introduced into *unfished* waters at Thorne.

Bufo calamita (The Natterjack Toad). Four pairs purchased from a dealer, introduced into disused sandpits in the vicinity of Finningley.

Lacerta agilis (The Sand Lizard). Taken from around Christchurch, Dorset. Seventeen lizards, including nine heavy with eggs, released on sandy wastes around Dunscroft, nr. Doncaster.

Helix pomatia (The Edible or Roman Snail). Taken from around Wye in Kent, approximately one hundred fully-grown snails released on an island in the old brickyard at Thorne.

Hydrophilus piceus (Giant (Silver) Water Beetle). Taken from Romney Marshes. Nineteen imago and twenty-three larvae introduced near Thorne.

Drosera longifolia (Long Leaved Sundew). Last year, growing amongst the round-leaved variety of sundew, on Thorne Moors, I found very occasional specimens of the long-leaved variety. This June, finding *D. longifolia* in large numbers near Brockenhurst in the New Forest, I removed a few hundred to the localities on Thorne Moors where I had previously found the same type.

May I appeal to anyone finding any of these species not to take them, but to report their occurrence with any relevant notes.—W. Bunting.

[We deplore Mr. Bunting's action in introducing these species. In the case of the long-leaved sundew, both species of which at one time grew on Thorne Moors, much doubt existed as to whether the species were not now extinct as neither had been seen for very many years. An appeal for a voucher specimen has not met with any response. In future any botanist meeting with *Drosera longifolia* or *D. anglica* on Thorne Moor will not know if the plants are indigenous survivors of the original populations or the products of Mr. Bunting's irresponsible action.—Ed.]

Marking of Butterflies.—Specimens of the Painted Lady (*V. cardui*) and Large White (*P. brassicae*) are being caught this autumn on the Isle of Canna and are being released after marking with light blue paint on the right forewing in order to study insect migration in the Hebrides.

I would be much obliged if anyone observing any of these marked butterflies would communicate with me.—J. L. Campbell, Isle of Canna, Scotland.

THE SPRING FUNGUS FORAY AT HULL

W. G. BRAMLEY

THE Spring Foray was held at Hull on April 8th-11th, 1949. Through the kindness of the Registrar and the Professor of Botany, facilities for work were given in the University College buildings and excellent accommodation was provided in one of the hostels close by.

Numbers attending were slightly less than usual and we missed the Chairman (Dr. Sledge) whilst the absence of Mr. E. W. Mason and the ' wood choppers ' was especially noticeable both in the field and in the laboratory during the evening. To make amends, however, we were very pleased to welcome a newcomer in the person of Dr. R. W. G. Dennis, of Kew, evidence of whose presence is indicated by the list of discomycetes.

Under the guidance of Mr. J. Webster, who had made all the arrangements, a very agreeable coach ride took us to Houghton Woods where collecting began in earnest. The afternoon was not so good as dense birch scrub was encountered and the ground was surprisingly dry for so early in the season. The return journey *via* the foothills of the Wolds was much appreciated by the visitors.

Saturday was spent on the Burton Constable estate and here again collecting was better in the morning. Sunday morning was spent in the laboratory examining material and discussing various problems. In the afternoon the more energetic explored Brantingham Dale, where considerable energy was required to ascend the steep valley slopes.

As usual, many interesting species were found and acquaintance made again with others. *Elaphomyces* was new to most of us, while *Marasmius esculentus* would probably have been passed over as *M. dryophyllus* until Dr. Dennis showed how it grows on spruce cones. Dr. Dennis also pointed out how for many years the common saprophytic discomycete on dead larch branches has been listed as *Dasyscypha calycina* (Schum.) Fckl. or later as *Trichoscypha calycina* (Schum.) Boud. Schumacher's fungus was on pine and is almost certainly distinct from that found on larch. *Trichoscypha* had also been used by Hooker for a genus of flowering plants in 1869 and so has priority over Boudier's use of it in 1885. In 1932 Naunfeldt proposed the name *Trichoscyphella* to replace *Trichoscypha* so that the name for the pine fungus is *Trichoscyphella calycina* (Schum.) Naunf. and is so used in this list. Though this clears up the pine fungus it unfortunately leaves us with no valid name for the discomycete on larch.

The writer is indebted to Dr. Dennis and Mr. Webster for the considerable help they have given in the preparation of this report.

B.=Burton Constable. H.=Houghton Wood.
Br.=Brantingham Dale. T.=Thwaite Hall.
* Not in Mason & Grainger for V.C. 61.
† Not in Mason & Grainger for Yorkshire.
‡ Not recorded for Britain so far as known.

Species followed by Yk. indicate that specimens are deposited in the Herbarium at the Yorkshire Museum. Those followed by number are in the Herbarium at University College, Hull.

MYXOMYCETES

Badhamia utricularis Berk., B.
Breffeldia maxima Rost., B.
Hemitrichia vesparium Macbr., B.
Trichia affinis de Bary, B.
T. botrytis Pers., Br.
T. varia Pers., Br.

ASCOMYCETES

EUROTIALES

Elaphomyces granulatus Fr., H.

PEZIZALES AND HELOTIALES

Anthracobia (*Humaria*) *melaloma* (A. & S.) Boud., B., Yk.
Bulgaria inquinans (Pers.) Fr., on *Fagus*, H.
**Corynella atrovirens* (Pers.) Boud., on *Acer*, B.

**Dasyscypha acuum* (A. & S.) Fr., on *Pinus* needles, H., 950.
D. nivea (Hedw. fil.) Sacc., Br., 937, on *Quercus*, B., 943.
†*D. pudibunda* (Quel.) Sacc., on *Salix*, H.
†*D. pulveracea* (A. & S.) von Höhn., on *Rosa*, Br., 856.
D. virginea (Batsch) Fckl., on *Fagus* cupules, Br., 860 ; on *Picea*, Br., 864.
**Desmazierella acicola* Nits., on *Pinus* needles, H., 949.
†*Helotium amenti* (Batsch) Fckl., on *Salix* catkins, H., 954.
H. cyathoideum (Bull.) Karst., on *Urtica*, B., 960.
†*Mollisia graminea* (Karst.) Karst., on *Deschampsia*, Selby, 3/4/49.
M. ligni (Desm.) Karst. (=*lignicola* Phill.), on *Acer*, B.
Orbilia leucostigma Fr., on *Diatrype* on *Betula*, Br.
Polydesmia pruinosa (B. & Br.) Boud., on *Diatrype*, H.
Sclerotinia curreyana (Berk.) Karst., on *Juncus*, H.
†*Tapesia rosae* (Pers. ex Fr.) Fckl., on *Rosa*, Br.
†*Trichoscyphella calycina* (Fr.) Naunf., on *Pinus*, H.
†*Unguicularia* (*Dasyscypha*) *scrupulosa* (Karst.) von Höhn., B., 946.
‡*Unguiculella aggregata* (Feltgen) von Höhn., on *Salix*, T., 1090. (See appended description.)
†*Urceolella* (*Dasyscypha*) *stevensonii* (B. & Br.) Boud., on *Pinus*, H., 944.

PHACIDIALES AND HYSTERIALES

†*Farlowiella carmichaeliana* (Berk.) Sacc., on *Picea*, Br., 877. *(stat. con.= *Monotospora megalospora* B. & Br., on *Larix*, B., 959a.
†*Gloniopsis levantica* Rehm., on *Crataegus*, Br., 857.
†*Lophodermium piceae* (Fckl.) von Höhn., on *Picea*, Br.
Propolis faginea (Schrad.) Karst., on *Ligustrum*, Br., 855.

SPHAERIALES

**Anthostoma turgidum* (Pers.) Nits., on *Fagus*, Br., 853 ; T., 945.
**Berlesiella nigerrima* (Blox. ex Curr.) Sacc., on *Diatrype stigma* on *Acer*, B., 848.
Bertia moriformis (Tode) de Not., on *Ligustrum*, T., 852 ; on *Fagus*, Br., 861.
**Calyculosphaeria* (*Nitschkia*) *tristis* (Fckl.) Fitzp., on *Quercus*, B., 845.
**Chaetosphaeria phaeostroma* (Mont.) Fckl., on *Acer*, B., 846a ; on *Fraxinus*, Br., 875 ; on *Sambucus*, B., 834.
†*Cryptodiaporthe salicina* (Curr.) Wehm., on *Salix*, H., Yk.
Diatrype disciformis (Hoffm.) de Not., on *Betula*, Br., 863 ; on *Fagus*, T., 948.
Diatrypella favacea (Fr.) Ces. & de Not. (=*verruciformis*), on *Betula*, T., 827.
D. quercina (Pers.) Nits., on *Quercus*, B., 838.
**Didymella tosta* B. & Br., on *Epilobium*, B.
Hypoxylon coccineum Bull., on *Fagus*, T., 828.
**H. multiforme* Fr., on *Betula*, B., 849.
**H. rubiginosum* (Pers.) Fr., on *Fraxinus*, B., 833; Br., 844.
H. serpens (Pers.) Fr., on *Acer*, T., 868.
**Lasiosphaeria hispida* (Tode) Fckl., on *Picea*, Br., 867.
L. spermoides (Hoffm.) Ces. & de Not., on *Salix*, T., 850.
**Leptosphaeria dolioloides* (Auersw.) Karst., on *Cirsium*, H., 836.
Melanconis stilbostoma (Fr.) Tul., on *Betula*, H.
†*Melanomma fuscidulum* Sacc., on *Sambucus*, T., 967.
M. pulvis-pyrius (Pers.) Fckl., on *Rhododendron*, H., 842a.
†*M. subdispersum* (Karst.) B. & V., on *Betula*, H., 957 (stat. con. *Helminthosporium longipilum*).
Ophiobolus acuminatus (Sow.) Duby, on *Cirsium*, B.
**O. rubellus* (Pers.) Sacc., on *Heracleum*, B.
Rosellinia aquila (Fr.) de Not., on *Acer*, B., 955 ; on *Fagus*, Br., 859.
Valsa ambiens (Pers.) Fr., on *Salix*, H., 961.
Xylaria polymorpha (Pers.) Grev., on *Fagus*, T., 953.

HYPOCREALES

Dialonectria sanguinea (Bolt.) Cke., Br.
**Giberella cyanogena* (Desm.) Sacc., on *Epilobium*, T., 840.
Hypomyces aurantius (Pers.) Tul., on *Polyporus betulinus*, H., 956.
**Hypocrea pulvinata* Fckl., on *P. betulinus*, H., 962.

BASIDIOMYCETES

UREDINALES

Phragmidium violaceum Wint., III, on *Rubus*, H., 837.
†*Puccinia cirsii-lanceolati* Schroet., OI, B., 847.
**P. conii* Fckl., II, on *Conium*, B., 840.
P. graminis Pers., III, on *Agropyron*, T., 851.
Uromyces ficariae (Schum.) Lev., on *Ran. ficaria*, B.
U. poae Rabenh., OI, on *Ran. ficaria*, B.

AGARICALES

†*Entoloma aprili* (Britz.) Sacc. f. *majus* Rom., B. (=*Rhodophyllus majalis* sensu Lange non Fr.).
Hypholoma candolleanum Fr., B.
**Marasmius esculentus* (Wulf.) Karst., H.
Polyporus adiposus B. & Br., B., 968.
**P. brumalis* (Pers.) Fr., on *Rhododendron*, B.
P. betulinus (Bull.) Fr., H.
Polystictus abietinus (Dicks.) Fr., H., Yk.
P. versicolor (Linn.) Fr., H., B.
‡*Acia stenodon* (Pers.) B. & G., on *Pinus*, T., 1092.
Daedalea quercina (Linn.) Fr., H.
Irpex obliquus (Schrad.) Fr., H., B., Br.
**Mycoleptodon fimbriatum* (Pers.) B. & G., on *Ulmus*, B., 1093.
**Corticium confine* Bourd., on *Picea*, Br.
C. confluens Fr., Br.
C. *laeve* (Pers.) Quél., on *Acer*, B.
C. porosum Berk. & Curt., on *Ulmus*, Br., Yk.
C. sambuci (Pers.) Fr., on *Sambucus*, B.
Pellicularia (*Corticium*) *subcoronata* (von Höhn. & Litsch.) Rogers, B., Yk.
Peniophora gigantea (Fr.) Nees, on *Pinus*, H., B., T., 1091.
**P. incarnata* (Pers.) Cke., on *Quercus*, B., Yk.
Stereum hirsutum (Willd.) Fr., H., B.
Solenia anomala (Pers.) Fr., on *Ulmus*, T., 873.

FUNGI IMPERFECTI

SPHAEROPSIDALES AND MELANCONIALES

†*Diplodia pinastri* (Lev.) Grove, on *Pinus* leaves, H., Yk.
†*Fusicoccum macrosporium* Sacc. & Bri., on *Fagus*, T., 887.
**Phoma acicola* (Lév.) Sacc., on *Pinus* leaves, H., Yk.
†*Sclerophoma pithya* (Schum.) von Höhn. & Litsch., on *Pinus* leaves, H., Yk.
†*Vermicularia lineola* (Cda.) Grove, on *Dactylis*, Patrington.

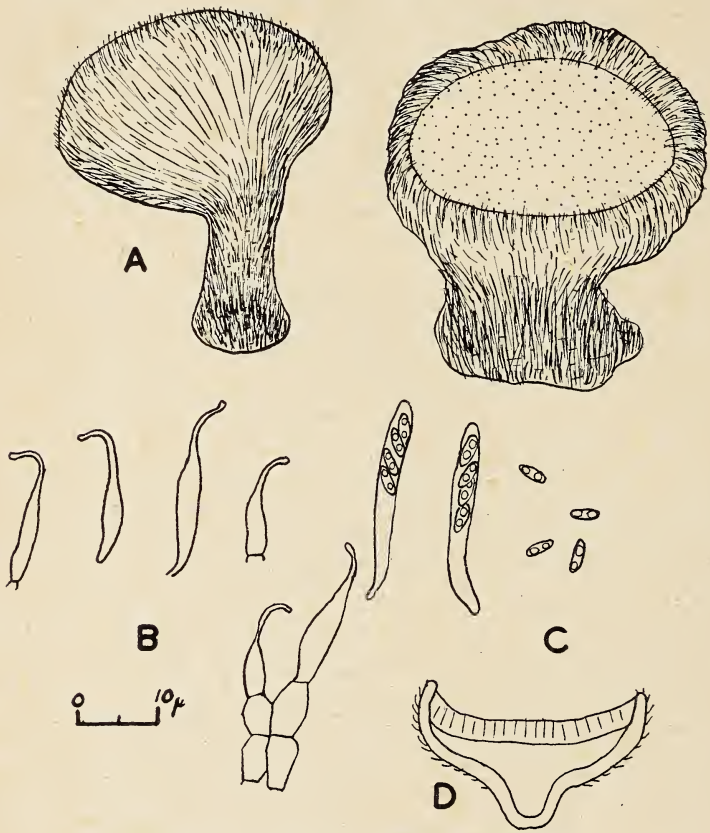
HYPHOMYCETALES

Brachysporium obovatum (Berk.) Sacc., on *Salix*, T., 829.
†*Clasterosporium fasciculariа* (Cda.) Sacc., on *Salix*, T., 831.
†*Cryptocoryneum hysterioides* (Cda.) Peyr., on *Ligustrum*, Br. ; on *Prunus spinosa*, Br., 942.
†*Dendryphium griseum* B. & Br., on *Urtica.*, B., Yk.
†*Helminthosporium turbinatum* B. & Br., on *Hedera*, B., 939a ; on *Sambucus*, B., 964.
Menispora ciliata Cda., on *Rhododendron*, B., 843b ; on *Ligustrum*, Br., 879.
**Monotospora sphaerocephala* B. & Br., on *Salix*, T., 830.
†*Oidium conspersum* (Link.) Lind., on *Salix*, T., 965.
†*Papularia arundinis* (Cda.) Fr., on *Hedera*, B., 951.
**Sporocybe flexuosa* (Mass.) Mason (M. & G. sub. *Graphium*) on *Rhododendron*, H., 842b ; on *Larix*, B., 959b.
**Sporoschisma mirabile* B. & Br., on *Picea*, Br., 866.
**Stachylidium cyclosporum* Grove, on *Rhododendron*, H., 952b ; on *Fagus*, T., 958.
**Torula ovalispora* Berk., on *Ligustrum*, Br., 826.

Unguiculella aggregata (Feltgen) von Höhnel *Sitz. Kaiser. Akad. Wiss. Wien Mathem.—naturw. kl.* 1906, CXV (Abt I), 93.

Pezizella aggregata Feltgen *Pilzflora Luxemburg Nacht.*, 1901, II, 39.

Apothecia standing singly, small (180=250μ in diameter) with a distinct incurved margin, stalked or seated on a peg-like base, yellowish-brown throughout except at the whitish margin. The exterior is minutely downy, clothed with characteristic hairs having a thin-walled brown bulbous base about 4μ wide and



***Unguiculella aggregata* (Feltgen) von Höhnel**

A.—Apothecia × 200. B.—Hairs × 1000. C.—Asci and spores × 1000.
D.—Median microtome section of apothecium × 100.

tapering into a fine hyaline bristle with a recurved blunt tip, 1μ wide ; total length of the hair 14-25μ. The excipulum is made up of polygonal, thin-walled, reddish-brown cells 5-6×4μ large which bear the bulbous hairs. Asci four-spored, club-shaped, tapering slightly at the base, but not stalked ; 18-30×4-4·5μ. Paraphyses scanty, unbranched, about half the length of the asci, tapering at the tip. Spores uniseriate, in the upper portion of the ascus, hyaline, biguttulate, elliptical or somewhat pointed at the ends ; 3·5-5×2-2·5μ.

On dead bark of *Salix*, growing with *Monotospora sphaerocephala* Berk. et Br., Thwaite Hall, Cottingham, E. Yorks. The specimen is in the Herbarium of the University College of Hull, No. 1090.

Dasyscypha bulbopilosa (Feltgen) von Höhnel, described from *Salix*, appears to be very similar but is described as having a hyaline subiculum and hairs 90μ long.

YORKSHIRE NATURALISTS' UNION EXCURSIONS IN 1949

WORSBOROUGH RESERVOIR AND ROCKLEY WOODS, May 21st

THE inaugural field meeting of the Union for the current year was held at Worsborough Dale, near Barnsley. The last official visit of the Union to this locality was on September 28th, 1899. Favoured by glorious sunny weather, the excellent attendance, under the guidance of Mr. W. R. Barker, F.G.S., thoroughly enjoyed their investigation of the large reservoir and its vicinity, and also Rockley Woods.

In the evening a general meeting was held, the Chair (in the unavoidable absence of the President, Miss Lorna I. Scott, M.Sc., F.L.S.) being occupied by Mr. E. G. Bayford, F.R.E.S., who had also been present at the excursion in 1899. Fifteen new members were elected. The recorders of various Sections presented their reports. A vote of thanks was accorded to the Wentworth Castle Estate for permission to visit the woods. It was enthusiastically resolved that a letter be sent to Mr. C. A. Cheetham conveying kind remembrances, with an expression of sympathy in his unfortunate accident and sincere wishes for a complete recovery therefrom. Many warm tributes were paid to the excellent services rendered by Mr. Cheetham to the Union.

The results of the work of the Sections are given in the following reports.

Geology (W. R. Barker) :—The strata of the area visited all belong to the Middle Coal Measures. Only one exposure was examined, and this was an opencast working of the Flockton Coal in Broomroyd Wood which is situated between Rockley Woods and Wentworth Castle. This coal was being worked at a depth of 15 feet below the Tankersley Ironstone. From the black shales immediately above the Flockton Coal was obtained an abundance of non-marine shells, and excellent specimens of *Carbonicola communis* and *C. regularis* were secured. Small coiled shells of *Spirorbis carbonarius* also occurred, and examples of the tiny ostracod, *Geisina arcuata*, along with a few fish scales were found.

Botany (G. A. Shaw) : As far as botanical records are concerned the day was uneventful and, as pointed out on the circular, the flora is what one would expect on the Coal Measures. Most of the plants mentioned on the circular were seen, but I saw no *Ranunculus Lingua*, though suitable sites are not lacking. The following were the more interesting flowering plants seen :

Ranunculus Flammula L.
Viola Riviniana Rchb.
Arenaria trinervia L.
Claytonia alsinoides Sims
Linum catharticum L.
Acer campestre L.
Alchemilla vestita (Buser) Raunk.
A. xanthochlora Rothm.
Myriophyllum sp.
Sanicula europaea L.
Conopodium majus (Gouan) Lor. & Barr.
Myrrhis odorata (L.) Scop.
Adoxa moschatellina L.
Viburnum Opulus L.
Tragopogon pratensis L.
Symphytum officinale L.
Galeobdolon luteum Huds.
Ophioglossum vulgatum L.

The mosses noted included the following :

Polytrichum juniperinum Willd.
Ceratodon purpureus Brid., c. fr.
Dicranoweisia cirrata Lindb.
Dicranella heteromalla Schp.
Tortula muralis Hedw., c. fr.
Aulacomnium androgynum Schwaeg.
Mnium hornum L.
Plagiothecium denticulatum B. & S.
Eurhynchium praelongum Hobk.
Brachythecium rutabulum B. & S.
Hypnum cupressiforme L.
H. cordifolium Hedw.
H. cuspidatum L.

Ornithology (Eric Thompson) : Worsborough with its mixed woods, marshy ground, and sheets of open water, should have provided a good list of birds, but this was not proved. The reservoir showed two pairs of Great Crested Grebe ; these had bred but the eggs were taken the same day of our visit by boys, one of whom proudly remarked he was going to eat them. Here a pair of Coot were seen, and a Redshank was heard. On the Rockley side of the water a party arriving early in the morning reported a Grasshopper Warbler, but when taken to the spot

only Sedge-Warblers were present. In the woods Blue Tit and Hedge-Sparrow had young. Whitethroats were common and near Rockley Dam a Chiffchaff was seen. On the return journey a pair of Turtle Doves completed the list.

My thanks are due to Mr. H. Hodgson for his part in this report.

Entomology (W. D. Hincks) : Collecting was restricted to a small area along a path bordering a polluted mill cutting which runs parallel with the south bank, and to the wooded western extremity of the reservoir.

Insects were plentiful. Several common species of beetles and many flies were abundant though only one species of the latter order (*Dioctria rufipes* (Deg.)) was collected. Particularly noticeable were the small parasitic Hymenoptera which exceeded in numbers of individuals and species what would normally be expected so early in the season. Many of them proved to be primary and secondary parasites of greenfly. Their hosts were abundant, doubtless a legacy of the mild winter, on several plants and some of the colonies were already heavily parasitised, especially those on nettles, red campion and various grasses. The greenfly parasites (*Aphidiidae*) so far determined were *Aphidius urticae* Hal., *A. avenae* Hal., *A. sonchi* Mshl., and *Monoctonus caricis* (Hal.). Associated with them as either primary or secondary parasites of greenfly were two species of *Charips* (Cynipidae), three or four Encyrtids (Chalcidoidea) (one of which was an interesting species of *Aphelinus*), three species of Ceraphrontidae, and the abundant Chalcid *Asaphes vulgaris* Walk. Among the several Platygastrids taken was the curious *Inostemma boscii* (Jur.). Five species of the minute egg-parasites (Mymaridae or Fairy-flies) were taken by sweeping (*Lymaenon* spp., *Anagrus ustulatus* Hal., *Polynema* sp. and *Ooctonus* sp.). The larger Parasitica were scarce and of the few Ichneumonidae taken *Alomya debellator* (Panz.), *Agrypon flaveolatum* (Grav.), and *Gelis ochracea* (Fst.) may be mentioned. A few species of Braconidae were also noted.

The commonest sawflies were *Dolerus aeneus* Htg. and *Tenthredopsis nassata* (L.) but also present, in some cases fairly plentifully, were *Loderus eversmanni* (Kby.), *Dolerus nigratus* (Müll.), *D. gonager* (F.), *Eutomostethus ephippium* (Panz.), *Euura amerinae* (L.), *Macrophya albicincta* (Schr.), *Athalia cordata* Lep. and *Aglaostigma fulvipes* (Scop.).

The Hemiptera taken included *Anthocoris nemorum* (L.), *Lygus pratensis* (L.), *Stenodema laevigatum* (L.), *S. calcaratum* (Fall.), *Scolopostethus decoratus* (Hahn) and *Piesma maculata* (Cast.).

Aquatic insects were poorly represented and consisted largely of species such as Chironomids able to exist in the larval stage in water of low oxygen content. Only two species of Caddis flies were noted by Mr. Whitehead (*Phryganea striata* L. and *Agrypnia pagetana* Curtis). The Alder fly (*Sialis lutaria* (L.)) was plentiful and a single Mayfly, *Leptophlebia vespertina* (L.), was taken. Mr. Whitehead captured the Neuropteron *Micromus variegatus* (F.).

Coleoptera (E. G. Bayford) : In the following list species marked '(a)' were taken by others but have been seen by me ; those marked '(b)' were taken by Mr. Hincks and the rest by myself.

Elaphrus cupreus Duft. (a) ; *Agonum assimile* (Payk.) ; *Clambus pubescens* Rdt. (b) ; *Eusphalerum torquatum* (Msh.) (b) ; *Stenus pubescens* Steph. (b) ; *Ontholestes tessellatus* (Gf.) (b) ; *Lathrobium elongatum* v. *fraudulentum* Gangl. (b) ; *Cantharis fusca* L. ; *C. rustica* Fall. ; *C. pellucida* F. (b) ; *C. livida* L. ; *C. cryptica* Ashe (b) ; *Malachius bipustulatus* (L.) (b) ; *Limonius minutus* (L.) ; *Athous bicolor* (Gze.) ; *A. haemorrhoidalis* (F.) (b) ; *Corymbites cupreus* (F.) ; *C. aeneus* (L.) ; *Cyphon paykulli* Guer. (b) ; *Byrrhus pilula* L. (b) ; *Byturus ochraceus* (Scrib.) (a) ; *Atomaria linearis* Steph. (b) ; *A. mesomela* (Hb.) (b) ; *Adonia variegata* (Gze.), an aberration with entirely black thorax ; *Adalia bipunctata* (L.) and ab. *4-maculata* (Scop.) ; *A. 10-punctata* (L.) ; *Rhagium bifasciatum* F. (b) ; *Gastrophysa polygoni* (L.) ; *Phaedon tumidulus* (Germ.) (b) ; *Chalcoides fulvicornis* (F.) ; *Longitarsus luridus* (Scop.) (b) ; *Mantura rustica* (L.) ; *Psylliodes affinis* (Pk.) (b) ; *Sitona lineatus* (L.) (b) ; *Phyllobius argentatus* (L.) ; *P. parvulus* (Oliv.) (b) ; *P. calcaratus* (F.) ; *P. pomaceus* Gyll. (b) ; *Curculio salicivorus* Payk. (b).

Lepidoptera (F. Hewson) : Butterflies and moths were far from abundant,

but the following species were reported as having been observed, mostly odd specimens.

BUTTERFLIES.

Wall (*Dira megera* L.)
Small Heath (*Coenonympha pamphilus* L.)
Small Tortoiseshell (*Aglais urticae* L.)
Holly Blue (*Celastrina argiolus* L.)
Small Copper (*Lycaena phlaeas* L.)
Large White (*Pieris brassicae* L.)
Small White (*P. rapae* L.)
Green-veined White (*P. napi* L.)
Orange Tip (*Euchloe cardamines* L.)

MOTHS.

Cinnabar (*Hypocrita jacobaeae* L.)
Grey Dagger (*Apatele psi* L.)
Small Yellow Underwing (*Panemeria tenebrata* Scopoli)
Mother Shipton (*Euclidimera mi* Clerck)
Garden Carpet (*Xanthorhoe fluctuata* L.)
Clouded Magpie (*Abraxas sylvata* Scopoli)

The hedges and woods yielded a very good catch of larvae, including the Yellow Tail (*Euproctis chrysorrhoea* L.), the Mottled Umber (*Erannis defoliaria* Clerck), the Feathered Thorn (*Colotois pennaria* L.), and other interesting geometers.

Larvae of the Garden Tiger (*Arctia caja* L.) on dandelion, and of the Gothic (*Phalaena typica* L.) on dock, were also found.

(The nomenclature is that of the Kloet and Hincks ' Check List.')

Freshwater Biology (H. Whitehead) : Mr. Hincks called my attention to some large caddisflies settled on tree trunks bordering the reservoir. These proved to be *Phryganea striata* L., ♂♂ and ♀♀. One of the latter measured 2¼ inches across the wings. The best find of the afternoon was a male of *Agrypnia pagetana* Curt. This is the first record of the species in Yorkshire.

Alder Flies—*Sialis lutaria* (L.)—were common and Mr. E. Thompson reported the capture of *Ephemera danica* Müll.

Dipping in the pools near the reservoir yielded numerous Phantom larvae (*Chaoborus* sp.) and several species of Entomostraca. Two species of Hydra, *H. viridissima* Pall. and *H. vulgaris* Pall. were found attached to water plants.

HARROGATE, June 4th-6th

THE meeting was carried out successfully due in great measure to the efforts of the Harrogate Naturalist and Scientific Society, who overcame difficulties of accommodation and provided transport to the various working grounds.

Flowering Plants (G. A. Shaw) : Scotton Banks proved somewhat disappointing from the point of view of botanical records and few of the plants which were mentioned in the circular were seen. These were mostly old records made upwards of sixty years ago, and the flora appears to have undergone some considerable change in the interval. The following, among others, were seen :

Stellaria nemorum L.
Hypericum Androsaemum L. (? escape).
H. hirsutum L.
Hydrocotyle vulgaris L.
Cornus sanguinea L.
Eupatorium cannabinum L.
Campanula latifolia L.
Myosotis sylvatica (Ehrh.) Hoffm.
Mimulus guttatus DC.
Orchis Fuchsii Druce
Listera ovata (L.) R. Br.
Scirpus sylvaticus L.
Carex hirta L.
C. sylvatica Huds.
C. lepidocarpa Tausch.
C. remota L.
C. Otrubae Podp.
C. remota × *C. Otrubae* (×*C. axillaris* Good.)
Phyllitis Scolopendrium (L.) Newm.
Asplenium Ruta-muraria L.
Ophioglossum vulgatum L.

In and about Picking Gill were seen *Viola palustris* L., *Hypericum quadrangulum* L., *Polygala serpyllifolia* Hose., *Stellaria nemorum* L., *Oenanthe crocata* L., *Convallaria majalis* L., *Equisetum sylvaticum* L. The writer spent some time on Sawley Moor in search of *Trientalis* and *Listera cordata* (L.) R. Br., without success, but saw *Drosera rotundifolia* L., *Oxycoccus quadripetalus* Gilib., *Vaccinium Vitis-Idaea* L., *Carex binervis* Sm. and *C. tumidicarpa* Anderss.

The woods and bogs by Oakdale Beck yielded :

Ranunculus Lenormandi F. Schultz
Corydalis claviculata (L.) DC.
Cardamine amara L.
Alchemilla glabra Neyg.
A. xanthochlora Rothm.
Drosera rotundifolia L.
Eupatorium cannabinum L.
Doronicum Pardalianches L.
Oxycoccus quadripetalus Gilib.
Melampyrum pratense L.
Carex pulicaris L.
C. paniculata L.
C. remota L.
C. paniculata × *C. remota* (× *C. Boenninghauseniana* Weihe.)
C. echinata Murr.
C. laevigata Sm.
C. pallescens L.
C. acutiformis Ehrh.
C. rostrata Stokes
C. vesicaria L.

Salix pentandra L. was reported from one of the reservoirs. In Cardale Wood the hybrid *Vaccinium intermedium* Ruthe was seen with its parents.

Bryology (A. Thompson) : SPHAGNA—Scotton Banks having an alkaline soil gave us no specimens of *Sphagna*. Picking Gill was poor, only three species being gathered there, viz., *S. squarrosum* Pers. var. *spectabile* Russ., a very large bed of this occurred in a drying-up pond ; *S. amblyphyllum* Russ. var. *macrophyllum* Warnst. ; and the very common *S. cymbifolium* Ehrh.

The moorland part of Haverah Park, visited on Whit Monday was good and yielded the following : *S. plumulosum* Röll ; *S. squarrosum* Pers. var. *subsquarrosum* Russ. ; *S. amblyphyllum* Russ. var. *macrophyllum* Warnst. ; *S. pulchrum* Warnst. ; *S. recurvum* P. de B. vars. *robustum* Breidl., *majus* Ångstr., and *parvulum* Warnst. ; *S. inundatum* Russ. var. *eurycladum* Warnst. ; *S. auriculatum* Schp. vars. *ovatum* Warnst., *canovirescens* Warnst., *submersum* Warnst. and *plumosum* Warnst. (this last variety has not previously been recorded for V.C. 64) ; *S. crassicladum* Warnst. var. *magnifolium* Warnst. ; *S. hakkodense* Warnst., rare in Britain ; *S. papillosum* Lindb. var. *normale* Warnst. ; *S. cymbifolium* Ehrh.

TRUE MOSSES.—No rare mosses were found though over fifty species were gathered. Scotton Banks was the best hunting ground and the district visited on Whit Monday was poor.

Representing Scotton Banks by S., Picking Gill by P., and the part examined the last day (named on the map Haverah Park) by H., the less common plants were : *Tetraphis pellucida* Hedw. with capsules which are not commonly found in Yorkshire, P. ; *T. Browniana* Grev., P. and H. ; *Seligeria calcarea* B. and S., abundant in fruit, S. ; *Dicranella cerviculata* Schp. on peat, P. ; *D. varia* Schp., S. ; *Fissidens crassipes* Wils. by streams, P. and S. ; *Ptychomitrium polyphyllum* Fuernr., S. ; *Tortula marginata* Spruce, not common in Yorkshire, S., ; *Encalypta streptocarpa* Hedw., P. ; *Orthotrichum affine* Schrad., P. ; *Aulacomnium androgynum* Schwaeg., S. ; *Orthodontium gracile* Schwaeg. var. *heterocarpum* Wats. covered thickly with capsules, P. ; *Bryum pseudo-triquetrum* Schwaeg., H. ; *Neckera pumila* Hedw., an uncommon moss in Yorkshire, S., ; *Leskea polycarpa* Ehrh., c. fr., S. ; *Eurhynchium Swartzii* Hobk., S. ; *E. pumilum* Schp., S. ; *E. myurum* Dixon, P. ; *Plagiothecium pulchellum* B. and S., P. ; *Amblystegium Juratzkanum* Schp., S. ; *Hypnum uncinatum* Hedw., P. and H.

Hepaticae (R. Lewis) : In spite of the fact that the country around Harrogate appears to be suitable for the growth of liverworts, the species seen were surprisingly few in number. The most abundant were *Conocephalum conicum* (L.) Dum. which covered large areas of rock on the banks of the River Nidd and *Marchantia polymorpha* L. which grew well with fruit in boggy places. The following is a full list of the species seen and the localities in which they occurred :

Conocephalum conicum (L.) Dum. Common everywhere.
Lunularia cruciata (L.) Dum. Scotton Bank.
Marchantia polymorpha L. Common everywhere.
Aneura sinuata (Dicks.) Dum. Scotton Bank, and a luxuriant floating form in a well at the head of Picking Gill.
Aneura latifrons Lindb. Doubtful, from Scotton Bank.
Pellia epiphylla (L.) Corda Scotton Bank
Pellia Fabbroniana Raddi Uncommon, Scotton Bank.

Aplozia sphaerocarpa (Hook.) Dum. Doubtful, from Picking Gill.
A. crenulata (Sm.) Dum. var. *gracillima* (Sm.) Heeg. Picking Gill.
Lophozia ventricosa (Dicks.) Dum. Picking Gill and Haverah Park.
L. attenuata (Mart.) Dum. Picking Gill.
Leptoscyphus Taylori (Hook.) Mitt. Picking Gill, abundant on stones in the stream.
Lophocolea bidentata (L.) Dum. Scotton Bank.
Cephalozia bicuspidata (L.) Dum. Haverah Park.
C. connivens (Dicks.) Lindb. Picking Gill.
Chiloscyphus polyanthus (L.) Corda Picking Gill.
Calypogeia Trichomanis (L.) Corda Haverah Park.
C. Meylanii Buch. Picking Gill. This species has not previously been recognised from Yorkshire ; see my note published on page 156 of this issue.
Lepidozia reptans (L.) Dum. Picking Gill and Haverah Park.
Diplophyllum albicans (L.) Dum. Picking Gill and Haverah Park.
Scapania dentata Dum. Haverah Park.
S. undulata (L.) Dum. Picking Gill.
Frullania dilatata (L.) Dum. Picking Gill.

I am indebted to Mrs. F. N. Appleyard and to Messrs. A. Thompson and G. A. Shaw for their kind assistance in the preparation of the above list and also to Dr. E. W. Jones for the determination of doubtful plants.

Fungi (W. G. Bramley) : Little was expected in the way of agarics and this was borne out. A few specimens of *Pluteus cervinus* and *Collybia radicata* were seen. Amongst the *Sphagnum* in the rills in Oakdale two species of *Tubaria* and *Collybia paludosa* were frequent. In the same place *Mitrula phalloides* was also noted in some profusion. Perhaps the best finds were two species of *Vibrissea* collected by Miss Burch and Mr. Wells in Picking Gill and later by the writer in Oakdale. These have not been recorded for a great many years and no doubt their habitat on wood lying in streams has a good deal to do with this. Another uncommon species was a *Dilophospora* attacking *Holcus*. Its typical characteristic of strangling the emerging ears was not shewn as the season was too early ; in fact the specimens looked as though they were attacked by *Phyllachora*. In a young larch plantation at Scotton the beautiful discs for so long listed as *Trichoscypha calycina* was extremely abundant and in fine condition. A full list of the species noted has been forwarded to the Harrogate Society.

* Not in Mason & Grainger for V.C. 64.
† Not in Mason & Grainger for Yorkshire.
O. = Oakdale. P. = Picking Gill. S. = Scotton.

ASCOMYCETES

Apostemidion (*Vibrissea*) *guernisaci* (Cr.) Boud., O. P.
Mitrula phalloides (Bull.) Chev., O.
Vibrissea truncorum (A. & S.) Fr., O. P.
Nectria aquifolii (Fr.) Berk. on *Ilex*, S.
†*Anthostoma gastrinum* (Fr.) Sacc., S.
**Didymella tosta* B. & Br., on Rosebay, S.
†*Didymosphaeria fenestrans* (Duby) Wint., S.
†*Melanconis modonia* Tul., on *Castanea*, S.
**Mycosphaerella maculiformis* (Pers.) Schroet., on *Castanea* leaves, S.
Ophiobolus acuminatus (Sow.) Duby, P. S.
Valsa ambiens (Pers.) Fr., on *Acer*, P. on *Fagus*, P. on *Ulmus*, S.
†*V. curreyi* Nits., on *Larix*, S.

BASIDIOMYCETES

Collybia radicata (Relh.) Berk., P. O.
†*C. palustris* Peck. (=*leucomyosotis*), O.
Pleurotus ostreatus (Jacq.) Fr., P.
Tubaria paludosa Fr., O.
T. stagnina Fr., O.
Corticium subcoronatum v. H. & L., P.
Peniophora setigera (Fr.) Bres., on *Quercus*, P. on *Alnus*, O.
Melanospora rostrupii Wagn., OI on *Mercurialis*, S.

BASIDIOMYCETES—*continued*

Puccinia winteriana Wagn., OI on *Allium*, S.
P. glomerata Grev., on *S. jacobaea*, P.
P. major Dietel, OI on *Crepis paludosa*, O.
Uromyces scillarum (Grev.) Wint., S.
U. valeriana (Schum.) Fckl., OI, II on *V. dioica*, OI, II on *V. officinalis*, O.

FUNGI IMPERFECTI

**Cercospora mercurialis* Passer, P.
**Dilophospora alopecuri* Fr., on *Holcus*, O.
Phoma acicola (Lév.) Sacc., on *Pinus* needles, P. O.
**Steganosporium pyriforme* (Hoffm.) Corda, S.

A number of the above specimens have been placed in the Herbarium of the Yorkshire Museum.

Ornithology (R. Chislett) : The steep wooded banks of the Nidd near Scotton and the wooded gills, rising to parklands with moorlands above, about Sawley Park, and below Beaverdike Reservoir, were sufficiently similar in character to ensure the occurrence of many species on all three days. Fifty-nine species were noted.

It was good to see several family parties of Long-tailed Tits, of Mistle-Thrushes, and to note the Goldcrests about the conifers. Nests were found of Great and Blue Tit, Coal and Marsh Tit (scarce) were also noted. After avoiding detection along Scotton Banks, three pairs of Tree-Creepers were noted with nestlings on the following days. Spotted Flycatchers were seen building, but were not numerous ; a cock Pied Flycatcher was admired in Picking Gill. Warblers were in good numbers, Chiff-chaff, Willow and Wood-Warbler (nest with young found by W. K. Mattinson), Garden-Warbler, Blackcap, and Whitethroat, and one pair of Sedge Warblers. Wrens (nests found), Robins, Hedge-sparrows and Redstarts (two nests found) were numerous. Song-Thrushes, although less numerous than Blackbirds, were not scarce. Several Great Spotted Woodpeckers were noted, and A. G. Walker found an occupied nest-hole. Green Woodpeckers were heard in two places. Birds of prey were scarce : only a Tawny Owl and the Sparrow-hawk were noted, R. Slater finding a nest in spruce with five eggs of the latter.

Further species listed were : Carrion Crow, Rook, Jackdaw, Magpie, Jay, Starling, Greenfinch, Lesser Redpoll (scarce), Bullfinch, Chaffinch (very numerous), Linnet, Yellow Bunting, Skylark, Tree-Pipit, Meadow-Pipit, Grey Wagtail (once), Pied Wagtail, Swallow, House Martin, Sand Martin, Swift, Cuckoo, Mallard, Wood Pigeon, Stock Dove, Lapwing, Common Sandpiper (once), Curlew, Moorhen, Coot (nest found), Pheasant.

The three fine days that followed several wet days synchronised with Whitsuntide with satisfactory exactness.

Lepidoptera (D. M. Jesper) : Seen on the Scotton Banks excursion : Green-veined White, Large White, Small Heath, Orange Tip, Clouded Magpie, Clouded Border, Silver Ground Carpet (empty Pussmoth cocoons on Poplars).

At Picking Gill : Green-veined White, Large White, Small Tortoiseshell, Orange Tip, Small Copper, Green Hairstreak, Ruby Tiger, Small Heath, Common Heath, Small Angle Shades, Chimney Sweeper, Silver Ground Carpet, Maiden's Blush.

At Birk Crag : Large White, Green Hairstreak (very numerous), Maiden's Blush, Silver Ground Carpet, Small Heath, Small Yellow Underwing, Map Winged Swift. The trees were badly defoliated by Winter Moth larvae in epidemic stage. Trees affected : Mountain Ash, Birch, Oak, and only stalks left on Bilberry.

Diptera (C. A. Cheetham) : The weather probably reduced the number of insects but more Tipulids were noted than at the meetings in 1948. The most

interesting dipteron was *Ctenophora pectinicornis* L. at Scotton Banks. *Tipula variipennis* Mg. was fairly plentiful and others taken were *T. vernalis* Mg., *T. variicornis* Schum., *T. lunata* L., *T. lateralis* Mg., *T. maxima* Poda, *T. oleracea* L., *Pachyrrhina anal is* Schum., *P. scalaris* Mg., *Pedicia rivosa* L. Amongst the few syrphids the large *Volucella pellucens* L. and *V. bombylans* L. were most noticeable with *Leucozona lucorum* L., *Chrysotoxum arcuatum* L., *Syrphus tricinctus* Fln., *Chilosia albitarsis* Mg. Mr. J. Wood handed me an immature specimen of *Atherix ibis* F. Above the water at Oak Beck *Hilara maura* F. was plentiful

Freshwater Biology (H. Whitehead) : Scotton Bank proved to be a happy hunting ground as far as aquatic insects were concerned. Here the River Nidd offers conditions favourable to many aquatic insects in their early stages of development. The banks are well wooded and covered with herbage which gives facilities and protection to newly emerged Stoneflies, Caddisflies and Mayflies. Of the last we took *Heptagenia sulphurea* (Müll.) in three of its stages : nymph (which favours swift rivers), sub-imago (known to fishermen as the Yellow Hawk) and imago. In shallow water were batches of eggs of *Baetis* attached to the undersides of stones and numbers of male *B. scambus* Etn. (Pale Watery Dun) were obtained by sweeping vegetation on the bank. The river in places had fairly extensive patches of sand—favourable for the burrowing nymphs of the Mayfly, *Ephemera danica* Müll. A number of imagoes and subs. of this species were seen on the wing.

Caddisflies taken on the wing were *Silo pallipes* F., *Lasiocephala basalis* Kol., *Lepidostoma hirtum* F. and *Leptocerus nigronervosus* Retz.

The only stonefly seen was the ' Yellow Sally ' (*Isoperla grammatica* (Poda)) which was very common.

The Lesser Snail Leech—*Glossosiphonia heteroclita* (L.) was found under a stone in a backwater. This species is not common in Yorkshire.

The excursion to Picking Gill was rather disappointing owing to the fact that the two lakes at the head of the gill had been cleared recently of aquatic plants. An item of interest was the finding of the two British species of Alderflies : *Sialis lutaria* (L.), which frequents ponds and slow streams and *S. fuliginosa* Pict., less common and living in moderately fast streams. Nymphs of the ' Yellow Upright ' *Rhithrogena semicolorata* (Curt.), were taken from the stream. There were also larvae of caddis belonging to the genera *Polycentropus* and *Rhyacophila*. A few larvae of the Dipteron, *Simulium* sp., were found under stones. Stoneflies in the winged state were *Leuctra nigra* (Oliv.), *L. hippopus* (Kemp.), *Protonemura meyeri* (Pict.) and one male *Nemoura erratica* Claas.

Although very little ground was covered during the excursion to Birk Crag, Mr. Cheetham and I found a good deal of interesting aquatics in Oak Beck to the west of Pot Bridge. Of the caddises, *Silo pallipes* F. were living as larvae in the stream and were also on the wing later in the afternoon. An interesting find was an old pupal case of this species with the projecting respiratory filament of its parasite, *Agriotypus armatus* (Walk.). See *Naturalist*, 1945, pp. 123-6. Larvae of *Polycentropus* and *Rhyacophila* occur here.

Two species of Mayflies in the winged state were taken, viz. : *Ephemera danica* (Müll.) and the fisherman's ' Turkey Brown,' *Paraleptophlebia submarginata* (Steph.). Both species were abundant. Nymphs of *Ecdyonurus venosus* (F.) in a late instar were found under submerged stones. Winged Stoneflies were well represented, *Isoperla grammatica* (Poda), *Chloroperla torrentium* (Pict.), *Leuctra inermis* Kemp., *L. hippopus* (Kemp.), *Protonemura meyeri* (Pict.) and *Nemoura erratica* Claas.

A few Alders were taken which proved to be *Sialis lutaria* (L.). Finally a large dead Crayfish was taken from the stream but was quickly returned !

To sum up the work of this section : although no new County or V.C. records were made, several interesting aquatic insects were seen and many happy memories remain.

	Scotton Banks	Picking Gill	Oak Beck (Birk Crag)	
DIPTERA				
Simulium sp.		L.		
TRICHOPTERA				
Silo pallipes F.	♂		♂ & L.	Larval case with *Agriotypus*, Oak Beck
Lasiocephala basalis Kol. ...	♂ ♀			
Lepidostoma hirtum F.	♀			
Leptocerus nigronervosus Retz.	♀			
Rhyacophila sp.		L.	L.	
Polycentropus sp.		L.	L.	
MEGALOPTERA				
Sialis lutaria (L.)		Im.	Im.	} Two sp. Alder Fly.
S. fuliginosa Pict.		Im.		}
EPHEMEROPTERA				
Ephemera danica (Müll.) ...	Im. & Sub.	Sub.	♂ ♀	V. Common
Paraleptophlebia submarginata (Steph.)			♀ Sub. N.	
Baetis scambus Etn.	♂ ♂			
B. sp. possibly *rhodani*	♀			
Heptagenia sulphurea (Müll.)...	♂ ♀ N.			
Rhitrogena semicolorata (Curt.)		N.		
Ecdyonurus venosus (F.)			N.	Late instar.
Cloeon sp.				N. from pond, Scotton.
PLECOPTERA				
Isoperla grammatica (Poda) ...	+		+	
Chloroperla torrentium (Pict.)			♂ ♀	
Leuctra nigra (Oliv.)		♂ ♀		
L. hippopus (Kemp.)		♂	♀	
L. inermis Kemp.			♂ ♀	
Protonemura meyeri (Pict.) ...		♂ ♀	♂ ♀	
Nemoura erratica Claas.		♂	♂	
CRUSTACEA				
Crayfish			+	
Eurycercus lamellatus (O.F.M.)		+		Large water flea, upper pool, Picking Gill.
LEECHES				
Glossosiphonia heteroclita (L()	+			Not common.
Herpobdella atomaria Carena	+			Common.

EAST WITTON, June 19th

FROM the small attendance at this meeting it was evident that the difficulties involved by lack of travel facilities were not easily overcome. The district offered good collecting ground and it was a pleasure to see the Dwarf or Burnt Tip Orchid in good numbers in one riverside meadow. The Large Skipper butterfly was flitting about in considerable numbers in the meadows by the Cover, whilst the troublesome clegs were too attentive. A sandfly, *Simalium reptans* L. was flying in fair quantity but did not appear to cause any trouble. The two large *Volucellas*, *V. pellucens* and *V. bombylans*, noted at Harrogate were again plentiful as was *Myiatropa florea* L.

Only two Tipulids were seen, *Pachyrrhina cornicina* L. and *Tipula lunata* L. (*ochracea*). Other flies caught were *Dioctria rufipes* Deg., *Chilosia impressa* Lw. and *Tetanocera elata* F.

Flowering Plants (C. M. Rob) : The abnormally dry season had not affected the low ground near the river to any great extent, but the higher ground visited was very parched and vegetation somewhat stunted.

The banks of the Cover and Ure were the most fruitful for flowering plants, the most frequent willow being *Salix purpurea* L. ; *S. alba* L., *S. aurita* L. and *S. fragilis* L. were also noted. *Prunus Padus* L. was abundant, often badly affected by caterpillars. In a small pool near Fishpond wood *Chara globularis* Thuill. was collected ; this has been verified by Mr. Allen. In the wood itself was a small patch of *Paris*, also *Carex elata* All., *C. acutiformis* Ehrh., *Scirpus lacustris* L. and *Typha latifolia* L. *Orchis ustulata* L. was abundant in one field by the Cover and other plants of the riverside area were *Crepis paludosa* (L.) Moench, *Hesperis matronalis* L., *Campanula latifolia* L., *Carduus crispus* L., *Mentha spicata* L. and *Mimulus guttatus* DC.

Doronicum Pardalianches L. was very abundant by the small stream from the river as far up as the Lodge. *Carex lepidocarpa* Tausch. also occurred in this gill, several plants growing in boggy ground about half-way up. *Myosotis repens* G. & D. Don was collected on the moor at the top of Sowden Beck Gill and *Aira caryophyllea* L. on Witton Fell at about 1,000 ft.

Mosses (Mrs. J. Appleyard) : Mosses were very disappointing, probably largely due to the dry conditions, although even in damper places near the streams there was little of interest.

Dichodontium pellucidum Schp. was plentiful, but very young. Two extensive sweeps of *Hypnum commutatum* Hedw. gave evidence of lime. They were unmixed with other mosses except for a little *Amblystegium filicinum* De Not. One tree gave *Zygodon viridissimus* R. Brown, *Orthotrichum affine* Schrad., and the hepatic *Radula complanata* (L.) Dum. *Orthotrichum anomalum* Hedw. var. *saxatile* Milde and *Grimmia apocarpa* Hedw. var. *rivularis* W. & M. were gathered from rocks near the stream. There was a considerable amount of *Conocephalum conicum* (L.) Dum.

Mammalia (J. P. Utley) : No specific record was kept of the animals, etc., seen on the excursion, but rabbit, hare and grey squirrel were noted and there was evidence of moles from the lowest to the highest altitudes visited. Mr. Maughan, the Agent, said that there was a vixen with cubs in Great Yaud Plantation, but these were not seen.

Ornithology (J. P. Utley) : The weather was excellent and a most successful meeting was held. The ornithological party worked the higher altitudes though one or two knowledgeable bird people went down by the Rivers Yore and Cover.

One of the first records was a family of Goldfinches near the Lowthorpe part of East Witton. Deep Gill contained a goodly number of birds including Nuthatch and Pied Flycatcher. As was expected the coniferous plantations did not carry many species but Coal Tit and Goldcrest were encountered in Great Yaud and what might be considered rather unusual, this conifer plantation held a number of pairs of Wood Warbler, a species generally found in deciduous plantations.

The moorland area vibrated with the varied calls of many Curlews but very few Lapwing were seen and no Golden Plover. Near the head of Sowden Beck a Short-Eared Owl was put up : this species is now being recorded from a number of localities. About the same location one pair of Ring Ousel was discovered. Near ' Slavering Sal,' a spring on Witton Fell, a Sparrow Hawk was disturbed from some fallen timber and, apart from Owls, this was the only bird of prey recorded.

The river party noted Kingfisher, Mallard, Oyster-catcher and Sandpiper. Mr. Maughan, the Agent to the Jervaulx Estate, states that Oyster-catchers are breeding on the gravel beds of the River Yore at a point near the Abbey (Alan Baldridge said he had also found them breeding on the River Swale gravel beds near Great Langton). Mr. Maughan said that Lesser Spotted Woodpecker was frequently seen and that at least two pairs of Coots had reared broods but neither of these species were recorded at the meeting. No Yellow Wagtails were reported

though this is a good country for them and the pastures leading up to Witton Fell generally hold a few pairs.

A total of 69 species, very good for a one-day excursion, is recorded as follows : Carrion Crow, Rook, Jackdaw, Magpie, Starling, Greenfinch, Goldfinch, Linnet, Bullfinch, Chaffinch, House Sparrow, Tree Sparrow, Yellow Bunting, Skylark, Tree Pipit, Meadow Pipit, Grey Wagtail, Pied Wagtail, Tree Creeper, Nuthatch, Great Tit, Blue Tit, Coal Tit, Marsh Tit, Long Tailed Tit, Goldcrest, Spotted Flycatcher, Pied Flycatcher, Willow Warbler, Wood Warbler, Garden Warbler, Whitethroat, Mistle Thrush, Song Thrush, Ring Ousel, Blackbird, Wheatear, Whinchat, Redstart, Robin, Hedge Sparrow, Wren, Dipper, Swallow, Martin, Sand Martin, Swift, Kingfisher, Green Woodpecker, Great Spotted Woodpecker, Cuckoo, Little Owl, Short-Eared Owl, Tawny Owl, Sparrow Hawk, Mallard, Wood Pigeon, Stock Dove, Oyster-Catcher, Lapwing, Common Sandpiper, Redshank, Curlew, Snipe, Black-Headed Gull, Moorhen, Red Grouse, Pheasant and Partridge.

STRENSALL, July 9th

Flowering Plants (D. H. Valentine and G. A. Shaw) : Most of the plants recorded in recent years by the York Naturalists were found. A fair amount of *Gentiana pneumonanthe* L. was seen but unfortunately firing had started (at short notice) over the range which covers much of the Common and it was therefore not possible to visit one of the ponds which has a rich flora, including *Utricularia* spp.

Of the less common plants observed those growing in marshy places, ditches or small ponds included *Stellaria glauca* With., *Potentilla palustris* (L.) Scop., *Apium inundatum* (L.) Rchb.f., *Oenantha fistulosa* L., *Anagallis tenella* (L.) Murr., *Menyanthes trifoliata* L., and *Baldellia* (*Alisma*) *ranunculoides* (L.) Parl. Owing to the drought it was possible to collect these easily. On drier ground *Genista anglica* L., *Ornithopus perpusillus* L. and *Serratula tinctoria* L. were seen, while hedges and wood margins yielded *Pimpinella major* (L.) Huds., *Daphne Laureola* L. and *Platanthera bifolia* (L.) L. C. Rich.

Other species seen included *Orchis Fuchsii* Druce, *Juncus tenuis* Willd. (found by Mr. Lewis and not previously recorded from V.C. 62), *Scirpus caespitosus* L. (a peculiar form with enlarged heads possibly teratological), *Carex tumidicarpa* Anderss., *C. Hostiana* DC. and *Dryopteris spinulosa* (Müll.) Warr.

Bryology (H. Walsh) : The deterioration of the Common with regard to its moss flora, mentioned in the circular, seemed very real to three of the Section, for the long period of dry weather that preceded the meeting would not account for the paucity of material collected compared with the older records. The dried-up state of the moss vegetation was indicated by the whitish patches of *Sphagna* and one had to get well down the stems to detect any moisture. In the area surveyed, comparatively small, the only well-distributed and conspicuous moss was *Aulacomnium palustre*, its leaves much twisted and curled. The Common has been noted for its wealth of *Polytrichum*, no less than seven species and varieties are on record, and of these three were found. Of the commonest mosses, *Dicranella heteromalla, Webera nutans* and its var. *longiseta* were much in eviednce. *Cephalozia bicuspidata* was the most prevalent hepatic, followed by *Gymnocolea inflata* and *Calypogeia trichomanis*. Three of the common thalloids were seen, *Pellia epiphylla* and *Conocephalum* in a roadside ditch, and an extensive patch of *Marchantia* with numerous infertile sporogonia was suspiciously near dwellings suggesting an introduction as it does not appear in the records. A gathering of a *Lepidozia* could have been named *L. trichoclados* on its vegetative features but the presence of ciliate tipped bracts agreed more with *L. setacea*.

The following is a complete list compiled from three reports :

Mosses

Catharinea undulata Web. & Mohr.
Polytrichum piliferum Schreb.
P. juniperinum Willd.
P. commune L., c. fr.
Ceratodon purpureus Brid., c. fr.
Dicranella heteromalla Schp., c. fr.
D. cerviculata Schp., c. fr.
Dicranum Bonjeani De Not.
Leucobryum glaucum Schp.
Fissidens taxifolius Hedw.

MOSSES—*continued*

Aulacomnium palustre Schwaeg.
Orthodontium gracile Schwaeg. var. *heterocarpum* Wats.
Webera nutans Hedw. and var. *longiseta* B. & S.
Eurhynchium praelongum Hobk.
Hypnum fluitans L.
H. cupressiforme L.
H. cordifolium Hedw.
H. cuspidatum L.
H. Schreberi Willd.

HEPATICS

Cephalozia bicuspidata (L.) Dum.
Gymnocolea inflata (Huds.) Dum.
Calypogeia trichomanis (L.) Corda
C. fissa (L.) Raddi.
Lepidozia setacea (Web.) Mitt.
Alicularia geoscyphus De Not.
Pellia epiphylla (L.) Corda
Conocephalum conicum (L.) Dum.
Marchantia polymorpha L.

Fungi (W. G. Bramley) : Most of the few species found were taken just outside the village and very little on the Common. Mr. Lewis brought in a specimen of *Amanitopsis fulva*, a surprising find considering that the ground was baked dry. The following are not listed by Mason & Grainger for V.C. 62 :

Puccinia arrhenatheri Erikss., II, III, on *A. elatior.*
P. bromina Erikss., II, on *Bromus mollis.*
P. holcina Erikss., II, III, on *Holcus lanatus.*
Ustilago perennens Rostr. on *Arrhenatherum elatior.*

Ornithology (R. Chislett) : The results of the continued fine nesting weather were evident everywhere in the form of young birds, mainly concentrated in the woods about dykes that still contained damp mud. Thirty-seven species were identified in a small area—it was too hot to walk far. Warblers were quiet, and most birds only gave occasional song. Curlews were heard in the distance. It was pleasant to be able to watch a pair of Woodlarks with young on the wing. The full list comprised :

Carrion Crow, Rook, Magpie, Jay (two family parties), Greenfinch, Linnet, Bullfinch, Chaffinch, House and Tree Sparrows, Yellow and Reed Buntings, Skylark, Tree Pipit, Tree Creeper, Great, Blue, Coal, Willow and Long-Tailed Tits, Spotted Flycatcher, Chiffchaff, Willow Warbler, Whitethroat, Song Thrush, Blackbird, Robin, Hedge Sparrow, Wren (numerous), Swallow, Green Woodpecker, Heron, Wood Pigeon, Moorhen and Partridge.

BOOK REVIEWS

Fieldbook of Natural History, by **E. Laurence Palmer.** Pp. 664 with 2,000 illustrations. McGraw Hill Book Co., 42/-.

It is impossible not to be impressed by the huge amount of information packed into this book, however much one may doubt the publisher's claim that ' every question in the field of natural history can be answered ' by its use. It is an encyclopaedic compilation of botanical, zoological, geological and astronomical information. All the principal families of plants and animals, vascular and non-vascular, vertebrate and invertebrate, are covered by descriptions and illustrations of selected species. The briefer sections devoted to astronomy and geology give charts for the recognition of the night skies and instruct on the identification and nature of minerals and the types and characteristics of the principal sedimentary, metamorphic and igneous rocks. The terse descriptions of animals and plants—three per page in vertical columns and headed by admirable illustrations specially prepared for the book—are followed by information on geographical distribution, life history, economic significance and data of biological and ecological importance. Both popular and scientific names are given and domesticated animals and cultivated plants are included. The sections devoted to flowering plants and birds alone cover over 1,000 species.

The weakness of the book is that its wide scope precludes more than a brief treatment of each species and the availability of much of the information is proportional to the prior knowledge of the reader ; for unless he is already pretty well-informed he will be hard put to it to turn to the appropriate page for details of the organism about which he seeks enlightenment. How many ' campers,

hikers and sportsmen as well as students of natural history ' who happened to come across *Cordyceps*, *Monotropa* or *Balanoglossus* would be able to turn to the descriptions of their finds? Its value to English readers will also be considerably less than to Americans as the species chosen for illustration and description are predominantly trans-Atlantic. On the other hand it would be impossible for anyone with the ability to recognise a crab, a cow or a cabbage to fail to acquire much instruction from a careful perusal of this ample and beautifully-produced anthology of natural history knowledge. W.A.S.

Natural History of Marine Animals, by **G. E. MacGinitie** and **Nettie MacGinitie.** Pp. 473 with 282 figures. McGraw Hill Book Co., 36/-.

The scientific study of the living animal is a more difficult and exacting task than the dissection of its dead body. For this reason we know in general a good deal more about the anatomy and comparative morphology of animals than about their modes of life and general biology. This is especially the case with marine animals for the difficulties of study are increased by the environment in which they live.

In this book the authors have set out to give a general account of the natural history of marine animals, their food and feeding habits, methods of locomotion and respiration, growth and duration, commensal relations and enemies. The first part deals with the physical environment of the ocean as a habitat, sources and nature of available food materials and topics of particular interest in relation to many marine animals such as luminescence, special sense organs, growth rates and burrowing habits. The remainder of the book deals with the successive groups from protozoa to vertebrates. The systematic treatment naturally reflects the relative degree of information available about the different groups as well as the special interests of the authors. The data available for some groups is meagre ; the arthropods and mollusca on the other hand occupy nearly half of the entire systematic section. The treatment throughout is such as to make the book intelligible to the lay reader and it is generously illustrated by photographs and drawings. As the senior author is the director and the junior author research assistant at the Kirckhoff Marine Laboratory in California, the species discussed are mostly inhabitants of the Pacific Coast of North America ; but the book will be of value as supplementary reading for zoology students in this country as it brings together much useful information on an important and highly interesting aspect of marine zoology. W.A.S.

Background to Birds, by **Brian Vesey-Fitzgerald.** Pp. 122, with 25 photographic illustrations. Cassell & Co., 10/6.

This is a companion volume to the author's *Bird Biology for Beginners*. The first dealt mainly with physical characters, this book deals with habits and behaviour. It discusses the territory theory, the problems connected with song, courtship and display, nest construction and nesting habits, the relation of parents to young birds particularly in connection with feeding, and problems of migration. The salient facts of each topic are clearly presented and the possible or probable causes and explanations of behaviour are discussed.

As one would expect from so experienced an ornithologist and writer, Mr. Vesey-Fitzgerald is as cautious with his interpretations as he is reliable with his facts. The frontiers between fact and theory are always clearly defined. He is at pains to show the limitations as well as the utility of interpretations of behaviour which have found wide acceptance amongst ornithologists and how explanations which fit the observed facts for very many species may fail to do so for others. Despite the ever-growing popularity of serious ornithological work amongst amateurs and the considerable body of information which has resulted, there are still many gaps in our knowledge which could be filled in by detailed attention paid to particular problems. One of the merits of this first-rate introduction to the study of bird behaviour which is full of sound advice to bird watchers, is the way in which it continually throws out suggestions as to profitable lines of investigation suitable for the attention of the serious-minded amateur.

The photographs used to illustrate the book have no particular bearing upon its contents, but the fact that they are the work of Mr. G. K. Yeates is a sufficient guarantee of their high quality.

London's Birds, by **R. S. R. Fitter.** Pp. 256, with 21 photographic plates. Collins, 10/6.

Mr. Fitter's book on the birds of London should be of interest not only to Londoners but also to all serious ornithologists, for he has produced not so much a mere local avifauna as a full-length study of birds in a peculiar environment, and what Mr. Fitter writes will apply, in greater or less degree, to birds in towns everywhere. The greater part of the volume consists of the study of the different habitats available—the ground, buildings, trees, etc.—and there are chapters on migration and the relations between birds and other animals, including man ; by this arrangement Mr. Fitter has made his compilation of past records readable and has given continuity to the scattered observations of others. Few, if any, past records can have escaped the author ; there is even a mention of John Keats (better known as a watcher of the skies than of birds) shooting a ' tom-tit ' on Hampstead Heath. Mr. Fitter also writes extremely well and often divertingly ; but, while his book will appeal to the dilettante, the expert will find nothing at which to cavil. The accounts of recent changes in London bird life such as the arrival of the Black Redstart as a breeding species, and the gradual increase in wintertime of the Starling and Black-headed Gull, are of special interest. If anything could be added to an excellent book it would be a comparison with bird-life in other cities and an attempt to account for the adaptability of certain species to town life as a whole.

M.F.M.M.

Birds of Britain, by **J. D. Macdonald.** Pp. 153, with nine plates in colour and 83 text figures. G. Bell & Sons, Ltd., 8/6.

After an introduction, a ' guide to groups and families ' is followed by a ' guide to species.' A ' field key ' precedes each group of species, in which colours, size and distinctive features are briefly mentioned. Nine colour plates, slightly garish, by Miss Phyllida Lumsden supplement the inset illustrations in black and white. The principle behind the arrangement is obscure but the result original. Doves begin the list, and are followed by crows (the jackdaw leading), thrushes, warblers, ' seed-eaters,' ' tree-trunk foragers,' larks, etc., dipper and kingfisher, heron and bittern, gamebirds, inland water birds which include the corncrake (!), swans, geese and ducks, waders, gulls, and ' sea-birds ' (cormorants, shearwaters, auks, etc.).

The purpose of the book is stated to be to provide beginners with an easy guide to 200 of the commoner and resident species, the choice of which in some cases bears little relationship with probabilities in the field. Most beginners early learn to visit reservoirs and sewage farms. The purple sandpiper and the little gull are seldom seen inland but are included ; whilst the more frequent green sandpiper and black tern are omitted. The three rarer grebes are omitted, but the less frequent great northern diver is included.

Outstanding identification points are mostly indicated correctly, but the bills of the lesser-blackbacked gull, kittiwake, and common gull are all stated to be yellow, whilst the area in which the last-named species is ' a very common resident ' apparently includes the whole country, south as well as north of Tweed-Solway.

Further instances could be cited to show that the charge of birds at South Kensington is hardly sufficient qualification for pronouncements upon distribution. This is not exactly the book needed by beginners in bird-watching, although it goes more than half the way. It will help with the identification of many species and serve a purpose as an introduction, beyond which any who take the subject seriously should soon progress to the point of requiring something more complete

R.C.

Gall Midges of Economic Importance. Vol. VI., Miscellaneous Crops, by **H. F. Barnes.** Pp. 229, 14 plates. Crosby Lockwood & Son, Ltd., 15/-.

Dr. Barnes' volumes are intended primarily for the economic entomologist, but they also offer an excellent opportunity for the ordinary field naturalist to follow up a much neglected field of enquiry. In several places in the present volume the author calls attention to the need for the further investigation of problems which appear to be well within the scope and interest of the amateur entomologist. For instance, his excellent account of the gall midges injurious to

basket willows points the way to studies of the non-economic species and of the midges associated with other species of *Salix*.

The busy economic entomologist with his great diversity of insect problems must hail this series with relief and gratitude as a well presented and authoritative digest of the scattered literature of a difficult but important family of insect pests. The now unwieldy literature in many fields of entomology is so completely out of hand that its timely review by an expert in any one group is an invaluable contribution to progress.

Volume VI has a Foreword by Mr. A. Roebuck of the National Agricultural Advisory Service and after the customary Preface deals with the gall midges of ' Miscellaneous Crops ' under eleven sectional headings. These are midges injurious to (1) Bamboos, (2) Basket Willows, (3) Beverage plants, (4) Dye plants, (5) Textile plants, (6) Herbs, (7) Insecticide plants, (8) Oil plants, (9) Rubber plants, (10) Spices, and (11) Sugar plants. The excellent bibliography covers 362 titles.

Dr. Barnes maintains a consistently high standard which does him the greatest credit.

W. D. H.

The Dragon-flies of the British Isles, by **Cynthia Longfield.** Second Edition. Pp. 256, with 310 illustrations, including 31 in colour. (The Wayside and Woodland Series). Warne & Co., 17/6.

There is reason to rejoice when a first-class systematist having the outlook of a field naturalist writes a book. This happened twelve years ago when Miss Longfield, a member of the British Museum (Natural History) staff, brought out a book on dragon-flies. Now we have a second edition, revised and enlarged.

The book is intended for beginners and is written with the minimum of technical language consistent with clarity and usefulness. An account of the life histories is followed by a chapter on collecting, preserving and rearing dragon-flies. It would appear that some dragon-flies have a speed record of 60 m.p.h., that some can fly backwards, and that their power of vision extends to several yards. Here is promise of good sport, and it is encouraging for over teen-agers to know that ' running after them is very little use.' The author describes how the living captures whilst being held between the finger and thumb may be identified by means of the keys provided. It is pointed out that long series of specimens are not necessary in a collection. After a pair of any species has been taken it is urged that after identification the captive should be released.

The greater part of the book is devoted to descriptions. Chief characters, more detailed descriptions, nymph, habits, time of appearance and distribution are dealt with for each of the forty-four species. Under the heading distribution, a list of vice-counties is given, and Yorkshire naturalists will be interested to know that twenty-three species have been recorded from their county. Several species show migratory habits, and more information on this subject is required. Of the White-faced Dragon-fly [*Leucorrhinia dubia* (Hind)] we are told that ' one Yorkshire record points to an immigration, as numbers were seen at Scarborough in 1900 flying in from the sea.'

The determination of species by the examination of nymphs is too difficult a matter for any but a specialist to undertake. Much more information is necessary before keys can be made. This should be an incentive to breed out nymphs and also to attempt the more difficult task of raising specimens from eggs. The descriptions with the photographs render it possible to make out the genus of any nymph.

The illustrations, including some fine coloured drawings by Mr. C. O. Howard, are good and will be of value in determining species. A new feature in this edition is the reproduction in colour of twelve plates from original coloured drawings made by W. F. Evans for private circulation one hundred years ago. Many of these are more interesting from the historical point of view than as an aid to identification. As most of the drawings were made from specimens in the Stephen's collection it seems likely that the specimens were faded at the time the work was done. Details of venation were treated in a very sketchy manner. In spite of this the book may be regarded as a pattern of what the field naturalist requires.

H. W.

Handbooks for the Identification of British Insects. Vol. 1, Pt. 5, **Dermaptera and Orthoptera,** by **W. D. Hincks.** Pp. 20, 3/6 .Vol. 1, Pt. 10, **Odonata,** by **Lt.-Col. F. C. Fraser.** Pp. 48, 7/6. Vol. 10, Pt. 1, **Diptera : Introduction and Key to Families,** by **H. Oldroyd.** Pp. 49, 7/6. Royal Entomological Society of London, 41 Queen's Gate, South Kensington, S.W.7.

Entomologists in this country have been considerably hampered when identifying their captures by the deficiency of suitable literature, having had to depend on expensive volumes, some more or less out of date, or on scattered papers in the magazines, or very frequently on foreign works. The Royal Entomological Society is now overcoming this deficiency by the publication of a series of Handbooks, which, it is intended, shall cover all classes of British insects. Conciseness and cheapness are the main objectives. The first three parts, noted above, have now been issued, and will be warmly welcomed by the serious student, being just the type of publication he requires. The parts dealing with the Dermaptera and Orthoptera and with the Odonata are complete in themselves, the keys running down to species, while the Diptera, being a large group, require more than one part; the part so far published supplies keys to families only, and this will be followed by other parts bringing the keys down to species. Each part commences with an introduction followed by the identification keys.

The part dealing with Dermaptera and Orthoptera opens with a short general introduction of four pages, followed by 13 pages of keys. An interesting and useful feature is the inclusion of the commonest ' casuals,' which though not British, so frequently enter this country among bananas, etc. This part is illustrated by 74 figures. The introduction to the Odonata runs to 25 pages and deals principally with the external anatomy of adult and nymph. It is profusely illustrated by figures of wing-venation and appendages, abdomen colour pattern and, what will certainly prove useful to the fresh-water biologist, structural features of the nymph. Then follow keys to adults and nymphs. The introduction to the Diptera, pp. 1 to 33, is occupied mainly with external structure and larval forms, and is illustrated by one plate in colour and 97 other figures. Keys to families follow on pp. 37 to 48.

Each part gives brief notes on capture, preservation and life history.

The success of the keys can, of course, only be judged by systematic use of them. A notable feature of the Handbooks lies in the excellence and profusion of the illustrations. Altogether the Handbooks when complete will provide a valuable addition to the literature of British entomology. The get-up, paper and printing are, as one would expect, excellent. J.M.B.

The Dianthus, by **Will Ingwersen.** Collins Flower Monographs, No. 1. Pp. 128, with 11 colour and 12 monochrome plates from photographs. Collins, 10/6.

This is the first of a series of popular monographs on various genera of garden plants, designed to appeal to the amateur gardener as well as the professional. They do not, and are not intended to compete with the expensive specialist works which are the ultimate authorities in their own fields. Collins' aim at producing concise yet reasonably comprehensive surveys at a low price, which will provide stimulation and enough information for the majority of gardeners.

Mr. Ingwersen has himself spent many years collecting and cultivating rock-plants from the mountains of Europe and has a wide acquaintance with species of *Dianthus* in their native habitats. His preferences are those of the collector and lover of alpines : he delights in the natural species and their simple hybrids and writes very little about the more highly selected derivatives, such as the Carnation. He is concerned with *Dianthus* species and Pinks (the distinction between which he insists is important, though he is quite unable to state what it is), giving excellent chapters on cultivation, propagation and hybridisation and a survey of the finest and most interesting *Dianthus* species and their hybrids. If at times he lacks strict scientific accuracy (the intine is *not* synonymous with the pollen tube) it is usually premeditated and does not seriously affect the argument.

The black and white photographs are excellent, but the coloured are of uneven quality, some being rather poor. The only serious omission seems to be that there is no treatment of pests or diseases in the genus. But this detracts little from a readable and pleasant book, which is an excellent first member of the series.

L. F. H. M.

Introduction to Wild Flowers, by **Richard Morse.** Pp. 266 with 16 colour plates, 32 plates from photographs, 16 plates from drawings by Doris Meyer, and 16 drawings in the text. A. & C. Black Ltd., 12/6.

This book is divided into two parts. The first gives a general account of the characters and biology of the common British wild flowers arranged in chapters devoted to the best represented or most interesting families. The second part gives a synopsis of the families and series of lists showing the relative frequency of the species, their habitats, times of flowering and colours. There is also an appendix giving the scientific and popular names, times of flowering, and colour of each species, together with page references to the text; also separate indices to the Latin and English species and families described, and a very useful classified list of books for further reading covering simple and advanced works on systematic and ecological botany. By relegating much information to the later sections and appendices the author is free to develop his theme without overburdening it with repetitive and routine detail. The style is straightforward and free from pseudo-scientific or extraneous embellishments, the matter is accurate and devoid of fallacies or half-truths, and the photographs and drawings are carefully chosen and uniformly excellent representation of the species described. This is a sound, interestingly written, attractively produced and reasonably priced book which we unhesitatingly recommend to beginners.

W.A.S.

Common British Grasses and Legumes, by **J. O. Thomas** and **L. J. Davies.** Third Ed. Pp. 120 with 50 illustrations. Longmans, Green & Co., 9/-.

A few minor alterations principally in the notes referring to the economic values of the species appear to be the only alterations made in the third edition of this book. As the book is intended primarily as a ' guide to the identification of the various species in the field,' it is a pity that the opportunity afforded by the preparation of a new edition was not utilised to rectify some of the misleading statements referred to in our notice of the previous issue (*Nat.*, 1948, 16).

The Mysterious Sea, by **Ferdinand C. Lane.** Pp. x+261. Sampson Low, Marston & Co. Ltd., 10/6.

This book is as tightly stuffed with information as a doll with sawdust though the contents are the very reverse of dry. There is no topic connected with the seas on which Mr. Lane has not collected information and on which he does not provide facts and figures in abundance. The origin of the seas and how they got their salt, their depths and bottom deposits, their currents and tides, and the plant and animal life of their surface layers and depths ; famous voyages of exploration and famous shipwrecks, mutineers and pirates, charts and lighthouses, capes and islands, ships and trade routes, all are described with an agreeable vigour and enthusiasm. But it is a book which should be read a bit at a time, for Mr. Lane is frankly out to impress as well as instruct us with the many interesting and often extraordinary facts which he recounts ; and though he certainly succeeds in doing so there is so much sea lore compressed into the book that the treatment of each subject is necessarily brief, and one's capacity to assimilate can flag and one's sense of wonder tire from a surfeit of facts however interesting they may be. It is however, a remarkable miscellany of information about the seas which can hardly fail to arouse the interest and stimulate the imagination of the reader, young or old. The bibliography and index also add to the usefulness of the book.

W.A.S.

Snow White : The Story of a Polar Bear Cub, by **Jan Vlasák** and **Josef Seget.** Pp. 88 with 69 photographic illustrations. William Hodge & Co. Ltd., 12/6.

This is an account of how during the German occupation of Czechoslovakia a polar bear cub was reared by hand in the flat of Jan Vlasák, veterinary surgeon and superintendent of the Prague Zoo. A film giving a complete record of its development was shown two years ago at the Zoological Society of London and subsequently an account appeared in the *Illustrated London News*. The interest aroused has led to a fuller account being put on record in book form of a difficult experiment which lasted five months and which revealed the polar bear cub as at once a fascinating and charming but exasperatingly mischievous pet. This delightfully written and copiously illustrated account will appeal to all animal lovers, young or old, and is at the same time of considerable scientific interest.

CONTRIBUTORS

Ainsworth, G. H., 26-28, Circular Notes (Appendix)
Alexander, W. B., 1-8
Appleyard, Mrs. J., 155, 169

Baker, H. G., 148
Barker, W. R., Circular Notes (Appendix), 161
Bayford, E. G., Circular Notes (Appendix), 162
Beardmore, T. S., 134
Bramley, W. G., 11-12, 77-82, 157-160, 165-166, 171
Brown, J. M., 31, 175
Bunting, W., 156

Campbell, J. L., 156
Cheetham, C. A., 30-31, 34-36, 166-167, Circular Notes (Appendix)
Chislett, Ralph, 13, 25-26, 51-75, 85-86, 135, Circular Notes (Appendix), 141-142, 166, 171, 173

Dean, Fred, 75-76
Dearing, E., 17, 29-30, 46, 87, 91-97, 145-147
Dibb, J. R., 30
Dolman, G., 47

Fidler, J. H., 101-113
Fowler, T. M., Circular Notes (Appendix)
Fryer, G., 154

Good, R. D'O., 9-11
Grainger, Miss J., 40, 77-82
Grainger, John, 50
Grist, W. R., 147

Hazlewood, Mrs. A., 24-25
Henson, H., 49-50, 88, 99-100
Hewson, F., 162-163
Hilary, Miss D., 38-39
Hincks, W. D., 31-34, 41-42, 86, 132, Circular Notes (Appendix), 162, 173-174
Horsley, G. F., 155

Jefferson, F., Circular Notes (Appendix)
Jesper, D. M., Circular Notes (Appendix), 166
Jones, L., Circular Notes (Appendix)

Lewis, R., 156, 164-165

Meiklejohn, M. F. M., 8, 15, 173
Melmore, S., Circular Notes (Appendix)
Merton, L. F. H., 175
Morehouse, Mrs. E. M., 28-29, Circular Notes (Appendix)

Parish, Mrs. D., Circular Notes (Appendix)
Petch, T., 42

Rob, Miss C. M., Circular Notes (Appendix), 169

Sandwith, N. Y., 47
Seago, J. H., Circular Notes (Appendix)
Schroeder, W. L., 43-44
Shaw, G. A., 47, 83-84, 97, Circular Notes (Appendix), 161, 163-164, 170
Sledge, W. A., 13-17, 36-38, 45-46, 85, 87, 88, 133-134, 136, 153-154, 155, 171-172, 176
Smith, A. Malins, 156

Taylor, E. W., 76
Temperley, G. W., 18, 115-131
Thompson, A., 164
Thompson, Eric, 161-162
Thompson, Capt. J. L. Cloudsley-, 137-141
Tordoff, H., 91-97, 145-147

Utley, J. P., Circular Notes (Appendix), 143-144, 169-170

Valentine, D. H., 170
Versey, H. C., 132-133, Circular Notes (Appendix)

Walker, A. G., 48
Walker, D., 18
Walsh, G. B., 29, 149-153
Walsh, H., 18, 39-40, 47, 84, 97-98, 170-171
Wallis, A. J., 48, 144
Wattam, W. E. L., 23, 114
Webster, John, 47
Wheatley, D., 48
Whitehead, H., 20-23, 30, 89-90, 163, 167-168, 174
Wilson, W. A., 132
Winter, A. E., Circular Notes (Appendix)
Wood, B., 48

CLASSIFIED INDEX

COMPILED BY W. E. L. WATTAM.

Algae.—*Mougeotia Smithii*, new to science, found at Aysgarth, A. M. Smith, 156

Amphibia.—Y.N.U. Sectional Report, 1948, A. Hazlewood, 25 ; Introduction of Edible Frog, Marsh Frog and Natterjack Toad in the Thorne District, W. Bunting, 156

Biology (Freshwater).—Y.N.U. Sectional Report, 1948, H. Whitehead, 20-23 ; Excursion records, Worsboroughdale, H. Whitehead, 163 ; Harrogate, H. Whitehead, 167-168

Birds.—Bird Observatories and Migration, W. B. Alexander, 1-8 ; Common Kite on Holy Island, G. W. Temperley, 18 ; Gannets near Scarborough and Little Auks at Filey Brigg, A. J. Wallis, D. Wheatley and B. Wood, 48 ; Blackcap near Harrogate in January, A. G. Walker, 48 ; Ornithological Report for Northumberland and Durham for 1948, G. W. Temperley, 115-131 ; Verification of Ornithological 'Sight' Records, R. Chislett, 141-142 ; International Ornithological Congress, 142 ; Bird Song in Winter, J. P. Utley, 143-144 ; Sand Martins nesting in the Boulder Clay at Filey, A. J. Wallis, 144 ; Y.N.U. Interim Sectional Reports, R. Chislett, G. H. Ainsworth, 25-28 ; Committee of Ornithology Report, 1948, R. Chislett, 51-75 ; Circular records (Appendix), Worsborough Dale, T. M. Fowler ; Harrogate, A. G. Walker ; East Witton, J. P. Utley ; Strensall, F. Jefferson ; Brantingham Dale, G. H. Ainsworth ; Excursion records, Worsborough Dale, E. Thompson, 161-162 ; Harrogate, R. Chislett, 166 ; East Witton, J. P. Utley, 169-170 ; Strensall, R. Chislett, 171

Book Reviews.—Allan, P. B. M.—Moths and Memories, 17
Arris, E.—Walks : Lane, Woods, Downs, River, 17
Barnes, H. F.—Gall Midges of Economic Importance, Vol. IV, Ornamental Plants and Shrubs, 86 ; Vol. VI, Miscellaneous Crops, 173
Batsford Colour Book—Tropical Birds, Garden Flowers, 15
Blackmore, M.—Mammals in Britain, 14
British Birds Film Strip, 147
Brown, P. E., and Davies, M. G.—Reed Warblers, 135
Crompton, John—The Hunting Wasp, 16
Deans, A. S. C.—Bee Keeper's Encyclopaedia, 134
Duncan, F. M.—Wonders of Neptune's Kingdom, 14
Dunham, K. C.—Geology of the Northern Pennine Orefield, 132
Ennion, E. A. R.—The Lapwing, 86
Fisher, James.—The New Naturalist, 13
Fitter, R. S. R.—London's Birds, 173
Fitzgerald, B. Vesey—Bird Biology for Beginners, 15 ; British Bats, 86 ; Background to Birds, 172
Frazer, Lt.-Col. F. C.—Odonata, R.E.S. Handbook, Vol. 1, Pt. 10, 175
Gaymer, J. M.—I Found Happiness, 136
Gaze, R.—Norfolk Bird Life, 42
Higham, W. E.—Birds in Camera, 85
Hincks, W. D.—Dermaptera and Orthoptera, R.E.S. Handbook, Vol. 1, Pt. 5, 175
Hosking, E., and Newberry, C.—Art of Bird Photography, 85
Hodgson, N. B.—Grasses, Sedges, Rushes and Ferns of the British Isles, 133
Hyde, H. A., and Wade, A. E.—Welsh Ferns, 82
Ingwersen, W.—The Dianthus, 175
Jenkins, E. A.—Some Welsh Fungi, 16
Johns, C. A.—British Birds in their Haunts, 8
Johns, C. A.—Flowers of the Field, 133
Kroeber, E., and Wolff, W. H.—Adventures with Animals and Plants, 88
Krutch, J. W.—Henry David Thoreau, 88
Lancum, F. H.—Wild Birds and the Land, 15
Lane, F. C.—The Mysterious Sea, 176
Lockley, R. M.—The Golden Year, 15
Longfield, C.—Dragon-flies of the British Isles, 174
Macdonald, J. D.—Birds of Britain, 173
MacGinitie, G. E. and N.—Natural History of Marine Animals, 172
Morse, R.—Introduction to Wild Flowers, 176
Neal, E.—The Badger, 85
Norman, J. R., and Frazer, F. C.—Giant Fishes, Whales and Dolphins, 88
Oldroyd, H.—Diptera : Introduction and Key to Families, R.E.S. Handbook, Vol. 10, Pt. 1, 175

Palmer, E. L.—Fieldbook of Natural History, 171
Parker, E.—Predatory Birds of Great Britain, 135
Partington, F. and M.—A.B.C. of Photography, 136
Robinson, W. Kay.—Course of Nature, 16
Sparrow, K.—World of Living Things : Biology for Juniors, 17
Spence, M. and Everatt, M.—Short History of York, 76
Stanwell-Fletcher, T. C.—Driftwood Valley, 87
Stokoe, W. J.—Caterpillars of British Moths, 87
Temple, V.—British Butterflies, 135
Thomas, J. D., and Davies, L. J.—Common British Grasses and Legumes, 176
Traherne, M.—Be Quiet and go A-Angling, 134
Trew, C. G.—Questions answered about Wild Flowers, 134
Turner, E. M.—Common British Flowers, 15
Turner, J. H.—Petrology of the Northampton Ironstone Formation, 132
Turrill, W. B.—British Plant Life, 9-11
Vlasák, J., and Seget, J.—Snow White : The Story of a Polar Bear Cub, 176
Wender, Leo—Animal Encyclopaedia : Mammals, 14
Weston, W. A. R. D., and Taylor, R. E.—The Plant in Health and Disease, 16
Whitlock, Ralph—Common British Birds, 15
Yonge, C. M.—The Sea-Shore, 99-100
Youden, G. H., and Embry, B.—Butterflies and Moths of the Dover and Deal District, 147

Botany (Flowering Plants).—Study of British Plants, R. D'O. Good, 9-11 ; Y.N.U. Sectional Reports, 1948, C. A. Cheetham, W. A. Sledge, D. Hilary, 34-39 ; Circular records (Appendix), Worsborough Dale, W. R. Barker ; Harrogate, G. A. Shaw ; East Witton, C. M. Rob ; Strensall ; Brantingham Dale, D. Parish ; Excursion records, Worsborough Dale, G. A. Shaw, 161 ; Harrogate, G. A. Shaw, 163-164 ; East Witton, C. M. Rob, 169 ; Strensall, D. H. Valentine and G. A. Shaw, 170 ; British Hawkweeds, W. A. Sledge, 45-46 ; The Glabrous White Campion, N. Y. Sandwith, 47 ; Material for a Study of Tree Regeneration, H. Tordoff and E. Dearing, 91-97 ; Notes on Seeds and Seedlings, W. E. L. Wattam, 114 ; Differential Susceptibility of sub-species of *Melandrium dioicum* to attack by Aphidae, H. G. Baker, 148 ; Vegetative *versus* Sexual Reproduction in *Primula vulgaris* Hudson, G. F. Horsley, 155 ; *Deyeuxia neglecta* (Ehrh.) Kunth at Malham, W. A. Sledge, 155 ; *Rynchospora alba* (L.) Vahl. at Helwith Moss, J. Appleyard, 155 ; Introduction of *Drosera longifolia* on Thorne Moors, W. Bunting, 156

Coleoptera.—Species found on imported Chanfuta Trees from Portuguese East Africa, W. D. Hincks, 41-42 ; Coleoptera of Askham Bog, J. H. Fidler, 101-113 ; Yorkshire Coleoptera in 1948, G. B. Walsh, 149-153 ; Introduction of *Hydrophilus piceus* in the Thorne District, W. Bunting, 156 ; Y.N.U. Sectional Report, 1948, G. B. Walsh, 29 ; Circular records (Appendix), Worsborough Dale, E. G. Bayford ; Harrogate, A. E. Winter and D. M. Jesper ; East Witton, W. D. Hincks ; Excursion records, Worsborough Dale, H. D. Hincks and E. G. Bayford, 162

Diptera.—Y.N.U. Sectional Report, 1948, C. A. Cheetham, 30-31 ; Circular records (Appendix), Harrogate, A. E. Winter and D. M. Jesper ; East Witton, C. A. Cheetham ; Excursion records, Harrogate, C. A. Cheetham, 166-167 ; East Witton, C. A. Cheetham, 168

Ephemeroptera.—Y.N.U. Sectional Report, 1948, J. R. Dibb, 30 ; Excursion records, Harrogate, H. Whitehead, 168

Fish.—Y.N.U. Sectional Report, 1948, A. Hazelwood, 25

Fungi.—*Tilletia* (?) *sphagni* Nawaschin at Bradfield, D. Walker, 18 ; Y.N.U. Sectional Report, 1948, J. Grainger, 40 ; Fungus Foray at Masham, 1948, W. G. Bramley and J. Grainger, 77-82 ; Y.N.U. Spring Foray at Sheffield, 1948, W. G. Bramley, 11-12 ; Circular records, Hull, Austwick (Appendix) ; Spring Foray at Hull, 1949, W. G. Bramley, 157-159 ; Excursion records, Harrogate, W. G. Bramley, 165-166 ; Strensall, W. G. Bramley, 171

Geology.—Y.N.U. Circular records, Worsborough Dale, W. R. Barker (Appendix); Harrogate, H. C. Versey; East Witton, H. C. Versey; Strensall, S. Melmore; Excursion records, Worsborough Reservoir and Rockley Woods, W. R. Barker, 161

Hemiptera.—Y.N.U. Sectional Report, 1948, J. M. Brown, 31; Circular records (Appendix), East Witton, J. M. Brown; Excursion records, Worsborough Dale, W. D. Hincks, 162

Hymenoptera.—Y.N.U. Sectional Report, 1948, W. D. Hincks, 31-34; Circular records (Appendix), Harrogate, A. E. Winter and D. M. Jesper; Excursion records, Worsborough Dale, W. D. Hincks, 162

Lepidoptera.—Y.N.U. Sectional Report, 1948, E. Dearing, 29, 46; Appeal for Assistance, 136; Circular records (Appendix), Worsborough Dale, J. H. Seago; Harrogate, A. E. Winter and D. M. Jesper; Brantingham Dale, L. Jones; Excursion records, Worsborough Dale, F. Hewson 162-163; Harrogate, D. M. Jesper, 166; Marking of Butterflies, J. L. Campbell, 156

Mammalia.—Y.N.U. Sectional Report, 1948, A. Hazlewood, 24; Circular records (Appendix), East Witton, J. P. Utley; Excursion records, East Witton, J. P. Utley, 169; Notes on the Water Shrew, F. Dean, 75-76;

Memorial Notices.—Walter Garstang, M.A., D.Sc. (Oxon.), portrait (H. Henson), 49-50; Thomas Petch, B.A., B.Sc. (J. Grainger), 50; Robert Procter (W. D. Hincks and W. A. Wilson), 132; Albert Wilson, F.L.S., F.R.Met.S. (W. A. Sledge), 153-154; Herbert Spencer (G. Fryer), 154

Microscopy.—Microscopic measurements, T. Petch, 42; From a Microscopist's Note Book, W. L. Schroeder, 43-44

Mollusca (Land and Freshwater).—Y.N.U. Sectional Report, 1948, E. M. Morehouse, 28-29; Circular records (Appendix), Worsborough Dale, E. M. Morehouse; Introduction of *Helix pomatia* in the Thorne District, W. Bunting, 156

Mosses and Hepatics.—*Pallavicinia Lyellii* (Hook.) Gray, at Austwick, H. Walsh, 18; Y.N.U. Sectional Report, 1948, H. Walsh, 39-40; Y.N.U. Bryologists at Plompton Rocks, H. Walsh, 98; Circular records (Appendix), East Witton, C. A. Cheetham; Strensall; Excursion records, Harrogate, A. Thompson and R. Lewis, 164-165; East Witton, J. Appleyard, 169; Strensall, H. Walsh, 170-171; *Dicranum montanum* Hedwig at Bolton Abbey, G. A. Shaw, 47; *Weisia tenuis* C.M. at Winestead, H. Walsh, 47; East Riding Hepatic Records, G. Dolman and J. Webster, 47; Hodder Valley Mosses, G. A. Shaw, 97; *Riccia bifurca* Hoffm. at Austwick, first county record, H. Walsh, 97; *Sphenolobus exsectiformis* (Breidl.) Steph. at Hebden Bridge, H. Walsh, 98; V.C. 64 Records of *Nowellia curvifolia* (Dicks.) Mitt., A Thompson, 98; *Calypogeia Meylanii* Buch. at Picking Gill, new to Yorkshire, R. Lewis, 156

Myriapoda.—Enemies of Myriapods, J. L. Cloudsley-Thompson, 137-141

Neuroptera and Trichoptera.—Y.N.U. Sectional Report, 1948, J. M. Brown and H. Whitehead, 30-31; Notes on *Hydropsyche angustipennis* (Curt.), illustrated, H. Whitehead, 89-90; Excursion records, Harrogate, H. Whitehead, 168

Orthoptera.—Species of Earwigs found on imported Chanfuta Trees from Portuguese East Africa, W. D. Hincks, 41-42

Phenology.—Y.N.U. Sectional Report, 1948, W. E. L. Wattam, 23

Plecoptera.—Y.N.U. Excursion records, Harrogate, H. Whitehead, 168

Reptilia.—Y.N.U. Sectional Report, 1948, A. Hazlewood, 24-25; Circular records (Appendix), East Witton, J.P. Utley; Introduction of Sand Lizard at Dunscroft, W. Bunting, 156

Yorkshire Naturalists' Union.—'Bird Observatories and Migration,' Presidential Address, 1948, by W. B. Alexander, 1-8; Annual Report, 1948, 19-40; Excursion Circulars (Appendix)

CIRCULAR No. 493

Yorkshire Naturalists' Union.

President:
Miss L. I. SCOTT, M.A., Leeds.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds, 7.

Assistant Treasurer:
Miss L. M. ANDERSON, 48 Denton Avenue, Gledhow, Leeds, 8.

General Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, via Lancaster.

The 493rd Meeting

WILL BE

A Foray for the Study of MICRO-FUNGI

HELD AT

UNIVERSITY COLLEGE HULL

From APRIL 7th to 11th, 1949

Chairman: Dr. W. A. SLEDGE, Dept. of Botany, The University, Leeds.
Recorders: Mr. W. G. BRAMLEY, Spring Cottage, Pallathorpe, Bolton Percy, York.
Dr. J. GRAINGER, West of Scot. Agri. College, Ayr.
Secretary and Convener: Miss J. GRAINGER, Wilshaw, Meltham, Huddersfield.
Leader: Mr. J. WEBSTER, B.Sc., Dept. of Botany, University College, Hull.

HEADQUARTERS.—By kind permission of the Registrar, accommodation is offered at the University Hostel, 'The Cedars,' 113 Cottingham Road, Hull, for sleeping and breakfast, other meals are taken at the College Refectory.

Terms for full board, 12/- per day. (If the cost of living rises, the charge may be rather more).

Members desiring reservation of accommodation should write to the Secretary, Miss J. Grainger, Wilshaw, Meltham, not later than March 1st, as the Registrar desires a firm *en bloc* booking at least a month before the Foray.

EXCURSIONS.—Places for collecting material will be chosen from amongst the following:

1. Burton Constable.
2. Brantingham Dale and Elloughton Dale.
3. Rise Park.
4. Woods at Ferriby.

LABORATORY FACILITIES will be available at the Dept. of Botany, University College, by kind permission of Professor R. D'O. Good.

MEETING.—A short business meeting will be held in the evening of April 9th to arrange further meetings and discuss progress made in the Herbaria of Micro-Fungi. New Workers will be welcomed.

MAPS.—Sheets 32 and 33 1" Ordnance Survey.

CIRCULAR No. 494

Yorkshire Naturalists' Union.

President:
Miss L. I. SCOTT, M.Sc., F.L.S., Leeds.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds, 7.

Assistant Treasurer:
Miss L. M. ANDERSON, 48 Denton Avenue, Gledhow, Leeds, 8.

General Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, via Lancaster.

Local Secretary:
R. S. ATKINSON, F.R.A.S., Secretary Barnsley Naturalists' Society.

The 494th Meeting

WILL BE HELD AT

Worsborough Reservoir and Rockley Woods, V.C. 63

On Saturday, MAY 21st, 1949

HEADQUARTERS.—For Tea and Meeting after the excursion, Red Lion Hotel, Worsborough Bridge. The proprietress, Mrs. Stocks, will provide a plain meal at 1/6 per head or a meat meal at 2/6 per person. Will those requiring tea please inform her not later than Saturday, May 14th. (Lunch can be had by morning visitors, but it must be ordered.)

PERMISSION to visit Rockley Woods has been given by the Wentworth Castle Estate Office, on condition that no damage is done, and no litter left about. It is pointed out that these woods are likely to be very much spoilt by opencast coal workings which began recently.

TRANSPORT.—Buses leave Barnsley Bus Station for Worsborough **Bridge** (Route 56) every 15 mins. Buses coming into Barnsley from Sheffield and Rotherham pass the Red Lion Hotel.

LEADERS.—Members of the Barnsley Naturalists' Society will act as leaders. The main parties are expected to arrive in the afternoon when, after meeting at the Red Lion Hotel, they will proceed across the road towards the reservoir, along the side of the old mill, across the footbridge over the railway until the Stainborough road is reached. Turn left along this road, cross the railway at Kendal Green Crossing and then take the footpath leading to the rear of the reservoir, working along the edge towards Rockley Woods. Those arriving in the morning will find plenty of scope by crossing from the hotel and proceeding straight ahead along the recognised footpath by the side of the stream. It is suggested that the main party meet at 1-30 p.m.

MAP.—The area to be visited is shown on Sheet 102, Huddersfield, one-inch Ordnance Map (1947 Edition).

GEOLOGY.—Mr. W. R. Barker, F.G.S., writes : The strata of the area to be visited all belong to the Middle Coal Measures which are made up chiefly of shales and clays with some sandstones.

Immediately north-east of the reservoir the Barnsley Coal outcrops. During the past 40 years this seam, which reaches a thickness of 10 feet, has been spasmodically worked by the old method of outcropping, but to-day it is being worked by the opencast method.

Many interesting fossil plants and animal remains have been collected from the roof of this seam, and are chiefly preserved in ironstone nodules. The following fossils have been collected :

Fossil Plants : *Sigillaria ovata, Lepidophloios acerosus, Alethopteris lonchitica, Aulocotheca elongata, Neuropteris heterophylla, N. gigantea, Sphenopteris* sp., *Rhodea subpetiolata, Zeilleria delicatula, Crossotheca schatzlarensis* (barren and fertile fronds).

Fossil Fauna : Fossil bone, *Euproops* (*Prestwichianella*) *rotundata* (King Crab), *Palaeoxyris helicteroides, P. carbonaria, P. prendeli, Vetacapsula johnsoni* (egg cases of fish).

The route to Rockley Woods will take the party over a series of outcropping strata ranging from the Barnsley Coal down to the Tankersley Ironstone. Scattered throughout these woods are numerous bell pits from where, many years ago, the ironstone was worked and hauled along in small corves by an old beam engine in the old engine-house near Falthwaite farm and smelted in the nearby bloomery, now in ruins.

Around the bell pits the black shales and fragments of ironstone which were thrown there when the ironstone was worked, are well worth searching over. The following fossil fauna have been recorded from these shales and ironstones :

Carbonicola regularis, C. obtusa, Anthraconaia robertsoni, Spirorbis carbonarius, Anthrapalaemon grossarti (crustacean).

References : *Geology of the County around Barnsley*, p. 46-7 ; *Memoirs of Geological Survey of Great Britain*, 1947 ; one-inch Geological Map of the ' New Series,'' Sheet 87.

BOTANY.—Mr. W. R. Barker, F.G.S., writes : The flora of this locality is a typical Coal Measure one, with the usual marshland, grassland and woodland associations.

In Spring the margins of Worsborough Reservoir are dotted with clumps of *Caltha palustris* and *Tussilago petasites*. Later in the year *Polygonum amphibium, Sagittaria sagittifolia, Alisma plantago, Sparganium ramosum*, and *Typha latifolia* are conspicuous. In the nearby streams and pools *Scutellaria galericulata, Ranunculus sceleratus, R. lingua* and *Polygonum hydropiper* are fairly frequent. In a neighbouring ditch the interesting *Chara fragilis* thrives.

In the fields between Worsborough Reservoir and Rockley Woods, *Polygonum bistorta* grows in damp situations, *Ciborium intybus* puts in occasional appearances on the borders of the fields, and on the roadside bank near Hound Hill *Anchusa officinalis* has established itself. On the slopes of a shale-heap near a disused colliery *Echium vulgare* grows freely.

On old walls at the back of Falthwaite Farm *Asplenium ruta-muraria* and *A. trichomanes* may be seen growing. At the front of this farm house is to be seen a good example of Witch's Broom growing on a cherry tree. Near the margin of Rockley Woods one meets occasionally with *Agrimonia eupatoria*, and on the banks of the stream which feeds Rockley Dam, *Impatiens noli-me-tangere* has been found.

Rockley Woods possess an interesting plant association, of which the mosses are particularly outstanding. The following mosses have been recorded from these woods : *Aulocomnium androgynum, Brachythecium rutabulum, Eurhynchium proelongum, Mnium hornum, M. punctatum, M. rostratum* and *Plagiothecium* sp.

A number of ferns occur, amongst which *Dryopteris spinulosa* may be noted. Amongst the trees, Oak, Birch and Beech predominate.

References : Names refer to Bentham and Hooker's *Flora*.

MYCOLOGY.—The Larger Fungi have been well worked and a list of them is in the hands of the Convenor of the Mycological Committee, Miss J. Grainger, who writes : The Mycological Committee would like any mycologists present to concentrate on the Micro Fungi, Uredines and groups which have received less attention. Specimens will be gratefully acknowledged by the keepers of Herbaria mentioned in the Annual Report.

ENTOMOLOGY.—Mr. E. G. Bayford F.R.E.S. writes : Worsborough Reservoir has not been worked regularly or systematically, and in consequence a ramble around it is full of possibilities. In the many visits that have been made to it no great varieties have been discovered, but the following list (Coleoptera) includes some species of more or less uncommon occurrence :

Carabus monilis F., *Cychrus caraboides* (var. *rostratus*), *Leistus fulvibarbis* Deg., *L. ferrugineus* L., *L. terminatus* Hell., *Helobium multipunctatum* L., *Elaphrus cuprens* Doph., *E. riparius* L., numerous species of *Bembidion, Agonum marginatum* L., *Anistoma humeralis* F., *Deronectes assimilis* Payk., *D. depressus* F., *D.* 12-*pustulatus* F., various species of *Hydroporus, Dytiscus marginalis* L., *Coccidula rufa* Herbst., *Anisosticta* 19-*punctata* L., *Coccinella* 11-*punctata* L., *Chalcoides* and other *Halticids*. *Rhagium bifasciatum* F. occurs in the willows on the banks, and also, less commonly, *Cryptorhynchidius lapathi* L.

It is worth mentioning that within a short distance of the reservoir specimens of the very local *Thymalus limbatus* F. were taken over sixty years ago.

Mr. J. H. Seago writes : The following species of Lepidoptera occur reasonably commonly within one mile radius of the reservoir and the list gives those liable to be encountered.

Butterflies : *Pararge megera, Maniola jurtina, Coenonympha pamphilus, Argynnis aglaja, Vanessa atalanta, V. cardui, Aglais urticae, Nymphalis io, Polyommatus icarus, Lycaena phlaeas, Pieris brassicae, P. rapae, P. napi, Anthocharis cardamines, Erynnis tages, Ochlodes venata.*

Moths : *Leothoê populi, Deilephila elpenor, D. porcellus, Spilosoma lutea, Arctia caja, Plusia chrysitis, P. gamma, Euclidimera mi, Zygaena lonicerae, Z. filipendulae, Zeuzera pyrina, Sphecia bembeciformis, Hepialus humuli.*

CONCHOLOGY (Mrs. Morehouse) : The water of the reservoir and the surrounding banks yielded very few molluscs in 1948. *Bithynia tentaculata* L., *Sphaerium lacustre* Müll., *Limnaea stagnalis* L., *L. pereger* Müll., *Paludestrina jenkinsi* Smith, *Succinea putris* L. On the banks *Helix nemoralis* L. was found. It is quite possible the woodland on the far side of the reservoir might yield more helices.

ORNITHOLOGY.—Mr. T. M. Fowler, F.R.P.S., writes : Worsborough Reservoir and Rockley Woods were for many years my favourite local places for studying bird life. The mixed woods, small reed beds, and the several small sheets of water attract both resident and migrant birds. By May 21st the residents should be supplemented by the migrants, the last of which will most probably have arrived before this date. I remember paying a visit to this area on that date and finding the nests of 17 species : Hawfinch, Chaffinch, Redpoll, Tree-pipit, Chiffchaff, Willow Warbler, Garden Warbler, Blackcap, Whitethroat, Song Thrush.

Probably the one that I was most pleased to see was that of the Hawfinch. It is a bird of the tree-tops, the nest being usually fairly high and inconspicuous. These birds seem to prefer a particular type of tree in the district where they are nesting. In the Rockley district more nests have been found in hawthorn than in any other tree.

In addition to the 17 species mentioned, a further 56 nest fairly regularly :

Carrion Crow, Magpie, Jay, Starling, Greenfinch, Goldfinch, Brown Linnet, Bullfinch, House Sparrow, Tree Sparrow, Yellow Hammer, Reed Bunting, Skylark, Yellow Wagtail, Pied Wagtail, Grey Wagtail, Tree Creeper, Great Tit, Blue Tit, Marsh Tit, Willow Tit, Long-tailed Tit, Gold Crest, Wood Warbler, Grasshopper Warbler, Sedge-Warbler, Spotted Flycatcher, Lesser Whitethroat, Mistle Thrush, Blackbird, Robin, Redstart, Hedge-Sparrows, Swallow, House-Martin, Swift, Nightjar, Kingfisher, Great Spotted Woodpecker, Cuckoo, Little Owl, Long-eared Owl, Tawny Owl, Barn Owl, Sparrow Hawk, Mallard, Great Crested Grebe, Wood Pigeon, Stock Dove, Turtle Dove, Lapwing, Sandpiper, Red Shank, Snipe, Woodcock and Pheasant.

Tea and Meeting at Headquarters, Red Lion Hotel. Tea, 6 p.m., followed by meeting for the election of new members and for the presentation of reports from the various sections.

The Next Meeting will be at Harrogate, V.C. 64, Whitsuntide, June 4th to 6th, 1949.

CIRCULAR No. 495

Yorkshire Naturalists' Union.

President:
Miss L. I. SCOTT, M.A., Leeds.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds, 7.

Assistant Treasurer:
Miss L. M. ANDERSON, 48 Denton Avenue, Gledhow, Leeds, 8.

General Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, via Lancaster.

Divisional Secretary:
WILLIS G. BRAMLEY, Bolton Percy.

Local Secretary:
D. M. JESPER, 23 Woodlands Grove, Harrogate.

The 495th Meeting

WILL BE HELD AT

HARROGATE

V.C. 64

WHIT WEEK-END

JUNE 4th to 6th, 1949

ACCOMMODATION.—Headquarters will be at the Mount Edgecumbe Private Hotel, Valley Drive, and accommodation will also be available at the Boston Private Hotel, Swan Road, and the Normandene Private Hotel, Valley Road. The terms will be 21/- per person per day at the Mount Edgecumbe, 20/- a day at the Boston, and 15/- a day at the Normandene. All three hotels are within easy walking distance of each other, and a common room for meetings will be available at the Mount Edgecumbe in the evenings. Members requiring accommodation are asked to write the Publicity Manager, Information Bureau, Harrogate, who will reserve accommodation for them at one of the three hotels,

Enquiries will be dealt with in the order in which they are received. Whilst every attempt will be made to reserve single rooms when required, there are very few of these, and it may be necessary to ask some members to share a twin-bedded room. Would members please state whether they have any objection to this when applying for accommodation.

TRAVEL.—Harrogate has an excellent rail and road service and is easily reached from York, Leeds and Ripon.

A private coach will convey members to Sawley on the Sunday and cost about 3/6 each.

ASSEMBLY.—Meet at Headquarters each morning at 10 a.m.

MAPS.—Ordnance Survey, Popular or Coloured Edition. Sheet 26. For Picking Gill see *Naturalist*, 1915, p. 205 and p. 231 ; Circular 378 and *Naturalist* 1933, p. 231.

ROUTES.—Saturday, Scotton Banks. Sunday, Picking Gill, Sawley. Monday, Birk Crag.

PERMISSION has been kindly granted to visit their estates by the following : Picking Gill, Sir John Barron, Sawley Hall ; Scotton Banks, Viscount Mountgarret and the W.R.C.C ; the land above Birk Crag and Beaverdike Reservoirs, the Harrogate Corporation Water Department. If any alteration is necessary a notice will be left at Headquarters.

GEOLOGY.—Dr. H. C. Versey : The terrain around Harrogate is made up in the main of rocks of the Millstone Grit Series but running south-west—north-east through the town is an asymmetric anticlinal axis which brings up Lower Carboniferous rocks, the most interesting of which is the Harrogate Roadstone. This anticlinal area is much fractured and it is through these fractures that the many medicinal springs reach the surface.

The alternation of grit and shale in the Millstone Grit Series produces the obvious succession of escarpments and strike valleys and locally the grits have been weathered into outstanding crags.

North-west of the area may be found frequent evidences of late-glacial disturbances of drainage and several successive ice-front positions and associated overflow channels may be recognised. Picking Gill, near Sawley, is related to a high ice-margin while the valley of Oak Beck is the overflow from an ice-dammed lake in Washburndale.

BOTANY.—G. A. Shaw writes : Scotton Banks, being on the Permian limestone, have a very rich and varied flora, and the following are among the more noteworthy of the plants likely to be seen : *Aquilegia vulgaris, Chelidonium majus, Corydalis claviculata, Viola odorata, Geranium sylvaticum, Prunus avium, Ribes alpinum, Chrysosplenium alternifolium, Solidago virgaurea, Clinopodium vulgare, Pinguicula vulgaris, Anagallis tenella, Populus tremula, Anacamptis pyramidalis, Orchis ustulata, Platanthera chlorantha, Ophrys apifera, O. insectifera, Spiranthes spiralis, Scirpus sylvaticus, Carex paniculata, C. pallescens, Calamagrostis epigejos, Dryopteris spinulosum, Equisetum maximum, E. hyemale.* Some of these are old records of which it would be useful to have confirmation.

Possibly the most interesting plant of the Birk Crag area is the hybrid *Vaccinium myrtillus x V. vitis-idaea* which is plentiful in Cardale Wood. Other plants recorded from the vicinity are : *Parnassia palustris, Doronicum pardalianches, Pyrola media* (Harlow Heath), *Platanthera bifolia, Ophioglossum vulgatum* and *Botrechium lunaria.*

Picking Gill does not figure much in the published records, but the following are on record for the Brimham and Sawley Moor areas : *Radiola linoides, Trientalis europaea, Platanthera bifolia, Leucorchis albida, Listera cordata, Gymnocarpium dryopteris,* and *Lycopodium selago.* Most of these require modern confirmation.

ENTOMOLOGY, etc.—A. E. Winter and D. M. Jesper : A butterfly which seems to be extending its range in the Harrogate area is the Holly Blue which was

seen within two miles of Scotton Banks last year and occurred at Picking Gill. It was also seen in the Harrogate borough.

Other species which may be seen in some stage of their metamorphosis are :

Scotton Banks.—Common Blue, Dark Green Fritillary, Large Skipper, Orange Tip, Small Heath, Peacock and many other species. Newly emerged Commas have been captured in the autumn in Harrogate and this may be breeding in the district. With regard to Moths the following species occur : Scotton Banks.—Elephant Hawk, Poplar Hawk, Eyed Hawk, Puss, Clouded Border, Swallow-tailed, Clouded Magpie, Figure of Eight, Miller, Poplar Grey, Small Yellow Underwing, *Tinnei* and many others.

Birk Crag Moths.—Light Emerald, Large Emerald, and many other species may be found on the Birches. Many of the Scotton Bank Insects will occur but the altitude is much higher.

No records for Picking Gill except the Holly Blue, but at the top of the Gill on the Moor, Emperor and Oak Eggar will occur and the Green Hairstreak is recorded about three miles away. This excursion should be most productive given a good day.

HYMENOPTERA.—Ants are numerous in all areas to be visited but *Formica rufa* is only to be found in Picking Gill and a large nest in the Summer House by the lake in the Gill will be of special interest.

Bees, Andrena and Halictus and attendant Nomada will prove interesting. Last year *Sirex gigas* was reported within a mile of Birk Crag and *Rhyssa persuasoria* from Knaresborough.

A number of Hymenoptera parasitisca have been bred from Aphid and many more interesting species could no doubt be added to the Yorkshire List.

DIPTERA.—*Bombylius major* and *Volucella bombylans* should be common at Birk Crags and Picking Gill.

COLEOPTERA (Birk Crags) : Given suitable weather conditions this locality should be productive and the following records are of beetles mostly associated with timber : *Triplax oenea* (Schal.), *Elater balteatus* (Linn.), *Melanotis rufipes* (Herbst.), *Scolytus scolytus* (Tal.), *Rhagium bifasciatum* (Tal.), *R. mordax* (Deg.), *Mycetophagus quadripustulatus* (Linn.), *Pityogenus bidentatus* (Herbst.).

Scotton Banks is an excellent locality offering scope for the investigation of the various habitat groups.

Lampris notiluca occurs in the banks at Beaverdike Reservoir lower lake and in the valley above Birk Crag. There is a very good Ephemerophon hatch on the reservoirs which are stocked with Brown, Loch Leven and Rainbow Trout. Crayfish are to be found in the Oak Beck and are numerous in the lakes.

The Slow Worm occurs in the quarry at Scotton Banks.

ORNITHOLOGY (Scotton Banks).—A. G. Walker : This area of the central Nidd valley should provide an interesting list of birds, mostly of the woodland and river haunting species.

It may be expected to see many of the following : Magpie, Jay, Hawfinch, Bullfinch, Yellow Bunting, Skylark, Tree Pipit, Pied Wagtail, Grey Wagtail, Tree Creeper, Nuthatch, Great Tit, Blue Tit, Coal Tit, Marsh Tit, Long-tailed Tit, Spotted Flycatcher, Goldcrest, Chiffchaff, Willow Warbler, Wood Warbler, Garden Warbler, Blackcap, Redstart, Kingfisher, Green Woodpecker, Greater Spotted Woodpecker, Little Owl, Tawny Owl, Kestrel, Sparrowhawk, Mallard, Stock Dove, Turtle Dove, Common Sandpiper, Moorhen and Pheasant.

The Willow Tit has not yet been identified in the Harrogate district. Long-eared Owls were suspected of nesting about two miles downstream from Scotton Banks in 1948. Amongst the species noted within two or three miles of Scotton Banks during last year were : Goldfinch, Reed Bunting, Yellow Wagtail, Canada Goose, Teal, Little Grebe, Woodcock, and Snipe.

Birk Crag—Pot Bank.—K. Ilderton, A. G. Walker : The following are some of the species suspected of breeding in this area : Carrion Crow, Magpie, Jay, Lesser Redpoll, Bullfinch, Skylark, Meadow Pipit, Yellow Wagtail, Pied Wagtail, Great Tit, Blue Tit, Coal Tit, Marsh Tit, Long-tailed Tit, Spotted Flycatcher, Wheatear, Redstart, Kestrel, Cuckoo, Teal, Curlew, Snipe, Redshank, Golden Plover, Lapwing and Red Grouse.

A Whinchat was seen in this area last year, and a pair of Pied Flycatchers occurred at Birk Crag last spring, but it is not known whether they stayed on to breed.

Meeting.—A Tea will be arranged at Headquarters at 6 p.m. Members must please notify their intention to be present to Headquarters.

A Meeting for the Election of New Members and to receive reports on the excursion from the various sections will follow the tea.

Next Meeting.—June 18th, East Witton, V.C. 65.

CIRCULAR No. 496

Yorkshire Naturalists' Union.

President:
Miss L. I. SCOTT, M.Sc., F.L.S., Leeds.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds, 7.

Assistant Treasurer:
Miss L. M. ANDERSON, 48 Denton Avenue, Gledhow, Leeds, 8.

General Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, via Lancaster.

Divisional Secretary:
Miss C. M. ROB, F.L.S., Catton Hall, Thirsk.

Local Secretary:
J. P. UTLEY, B.Sc., M.B.O.U., Romanby, Northallerton.

The 496th Meeting

WILL BE HELD AT

EAST WITTON

V.C. 65

On Saturday, JUNE 18th, 1949

HEADQUARTERS.—The Blue Lion Hotel, East Witton.
The starting time for the excursion will be 10-30 a.m. from Headquarters.

TRAVEL.—Bus Services (subject to alteration).

I—ARRIVALS.

(*a*) Leeds to Ripon.								
Leeds (Vicar Lane)	dep.	7-40	7-55	8-40	8-55			
,, (Wellington St.)	dep.					9-35	11-35	
Harrogate ...	dep.	8-35	9-5	9-35	10-5	10-20	12-20	
Ripon	arr.	9-14	9-40	10-14	10-40	10-40	12-40	
(*b*) York to Ripon.								
York	dep.	9-0	12-0					
Boroughbridge ...	dep.	9-55	12-55					
Ripon	arr.	10-17	1-17					
(*c*) Scarborough to Ripon.								
Scarborough ...	dep.	8-30						
Helmsley ...	dep.	10-30						
Ripon	arr.	12-30						

[P.T.O.

(*d*) Ripon to East Witton.

Ripon	dep.	9-15	11-15	
Masham	arr.	9-51	11-51	
,, ...	dep.	9-51	1-51	
East Witton ...	arr.	10-12	2-12	

(*e*) Darlington to East Witton.

Darlington ...	dep.	9-0	11-0	1-0
Leyburn	arr.	10-27	12-27	2-27
,, ...	dep.	12-15	2-46	
East Witton ...	arr.	12-30	3-1	

II—Departures.

(*f*) East Witton to Darlington.

East Witton ...	dep.	5-50	
Leyburn	arr.	6-5	8-45
,, ...	dep.	6-45	10-10

(*g*) East Witton to Ripon.

East Witton ...	dep.	5-1	7-1	9-1
Masham	dep.	5-22	7-22	9-22
Ripon	arr.	5-58	7-58	9-58

(*h*) Ripon to Scarborough.

Ripon	dep.	5-10	
Halmsley ...	dep.	7-5	
Scarborough ...	arr.	8-55	

(*j*) Ripon to York.

Ripon	dep.	6-30	8-0
Boroughbridge ...	dep.	6-52	8-22
York	arr.	7-43	9-13

(*k*) Ripon to Leeds.

Ripon	dep.	7-35	8-54	9-24
Harrogate ...	dep.	8-5	9-35	10-5
Leeds (Vicar Lane)	arr.		10-27	11-12
,, (Wellington St.)	arr.	8-50		

Due to the paucity and inconvenience of the bus services, it is hoped that as much use as possible will be made of private cars.

ROUTES.—(*a*) For Botanists, Entomologists, etc. :—East Witton, Cover Bridge down south bank of River Ure to Green Lane examining Fish Pond Plantation on the way. Up Green Lane to Harker Beck Bridge with a deviation to Lockham Plantation. Up Harker Beck to Lamb Hill Plantation and back to East Witton via Lowthorpe.

(*b*) Mainly for Ornithologists :—East Witton via Lasthorpe to Lamb Hill Plantation, up Deep Gill through Ramshaw Quarry Plantation, Grey Yaud Plantation, up How Gill Plantation to East Belt Plantation, through West Belt Plantation and on to Sowden Beck ; deviating to Witton Fell and back up Sowden Beck Road.

MAP.—The whole area is shown on the one-inch Ordnance Survey Map. Sheet 21. (Ripon & Northallerton).

PERMISSION.—Permission to visit the places mentioned in the two routes has been very kindly granted by W. L. Christie, Esq., of Jervaulx Abbey.

No dogs will be allowed on any part of the routes and all members are earnestly requested to avoid disturbing game, to ensure that all gates are properly closed and secured and to cause no unnecessary disturbance of stock.

GEOLOGY.—H. C. Versey, D.Sc., F.G.S. : East Witton lies near the junction of the Yoredales and Middle Grit series. The Yoredale beds range from the Middle to the Main Limestone but an extensive cover of glacial drift prevents complete examination of them. The Millstone Grit forms the slopes and summits of Braithwaite Moor and Witton Fell. Two coal seams may be seen in Red Bank Gill and there are many signs of old workings.

Glacial drift extends up to 1,100 feet in many places and the moor is trenched by overflow channels at 1160′ O.D. and 1125′ O.D. which carried the drainage from Lake Coverdale into Colsterdale Lake.

BOTANY.—Flowering Plants (C. M. Rob, F.L.S.) : The district especially that around Jervaulx and by the River Ure has been well worked by botanists and many plants are recorded. The Union met here in 1916 and 1927 and reports appear in the *Naturalist* for these years. Amongst plants recorded from Jervaulx are *Minuartia tenuifolia* (L.) Herm, *Lactuca virosa* L., *Meconopsis cambrica* (L.) Vig. (a washdown from some garden). At Coverbridge *Petasites hybridus* (L.) Gaertn. fruits abundantly, *Orchis ustulata* L., *Salix rubra* Huds. and *Cardamine amara* L. are frequent. *Trollius europaeus* L. is found between East Witton and Coverham. *Astragalus glycyphyllus* L. recorded between East Witton and Coverbridge has not been seen recently.

Mysotis brevifolia (C. F. Salmon) grows on Hauxwell Moor above Leyburn at about 700 feet and should be looked for by any botanists who get on to the fells.

MOSSES.—Chris. A. Cheetham, F.R.E.S. : Many mosses found in the Coverdale and East Witton area are given in *The Naturalist*, 1916, p. 298, and the 265th Circular. Some like *Plagiobryum Zierii* Lindb., *Webera cruda* Schwaeg., *Orthothecium intricatum* B. & S., *Seligeria pusilla* B. & S., and *Bartramia oederi* Schwaeg., are restricted to limestone. The gritstone walls have much *Hypnum cupressiforme* L. and *Leucodon sciuroides* Schwaeg. is widespread. *Neckera complanata* Huebn. was gathered in fruit so was *Mnium stellare* Reich. and *M. cuspidatum* Hedw. . . . *Hypnum hispidulum* var. *Sommerfeltii* Myr. is given for several nearby stations. By the riverside track *Muium undulatum* L. may be watched for fruit and *Hypnum Patientiae* Lindb. seen on the path sides whilst on the rocks and trees by the riverside are *Hypnum palustre* Huds., *Brachythecium plumosum* B. & S., *Fontinalis squamosa* L., *Dichodontium pellucidum* Schp., *Barbala spadicea* Mitt., and *Leskea polycarpa* Ehrh.

ENTOMOLOGY.—Coleoptera (W. D. Hincks, F.R.E.S., M.S.B.E.) : Autumn collecting in North Wensleydale suggests that it would be a particularly profitable area for Coleoptera during June, the best beetle-collecting month of the year. Like most areas of V.C. 65, however, little is known of its entomology.

Attention should be directed particularly to the littoral fauna of the Rivers Ure and Cover and to the numerous ghylls which join the Cover in the vicinity of East Witton. In addition general sweeping should be profitable as the variety of plants is considerable. Bark and wood-feeding beetles should not be forgotten where there is decaying timber.

The late Mr. M. L. Thompson gave a brief list of Coleoptera (*Naturalist*, 1927, p. 25) taken on the banks of the Ure at Redmire. These include the littoral ground beetles *Bembidion litorale* (Oliv.), *B. saxatile* Gyll., and *B. atroviolaceum* Duf. The arenicolous Scarabaeid *Aegialia sabuleti* (Panz.) was also taken. The weevil *Zacladus geranii* (Payk.) was taken, without doubt, on *Geranium pratense* L. and also the flea-beetle *Longitarsus membranaceus* (Foud.) which is attached to *Teucrium scorodonia* L. Thompson also records the fungicolous *Orchesia minor* Walk., *Anaspis humeralis* (F.) (which will be beaten from Hawthorn and other blossom along with many other beetles), and *Philonthus ventralis* (Grav.).

A few species taken by the writer at Jervaulx and Masham may be mentioned in conclusion : *Anisotoma humeralis* (F.), *Thectura cuspidata* (Erichs.), *Quedius cruentus* (Oliv.), *Gabrius splendidulus* (Grav.), *Euplectus sanguineus* Denny, *Agaricochara latissima* (Steph.), *Pocadius ferrugineus* (F.), *Cerylon histeroides* (F.), *Anatis ocellata* (L.), *Chrysolina hyperici* (Fst.), and *Phytodecta pallida* (L.).

DIPTERA.—Chris. A. Cheetham : A good list of these can be seen on p. 89, *Naturalist*, 1927 ; they are under the heading of Middleham. On our present area we may find some steep stream side where sweeping the vegetation may give species like *Mycetophila fungorum* Dz., *Boletina plana* Wlk., *Polylepta undulata* Winn., *Mycomyia marginata* Mg., *M. Wankowiczii* Dz., *Macrocera centralis* Mg., *M. stigma* Curt., *Orphnephila testacea* Ruthé., *Dixa nebulosa* Mg., *D. nubilipennis* Curt., *D. puberula* Lw., *Limnobia quadrinotata* Mg., *Dicranomyia didyma* Mg., *Rhabdomastrix schistacea* Mg., *Gonomyia recta* Tonn., *Cylindrotoma distinctissima* Mg., and *Tipula pruinosa* W. All these were taken near Coverham Abbey and the following also, these latter I have not had elsewhere : *Neurigona suturalis* Fln., *Mydaea maculipennis* Ztt., *Spilogona brunneisquama* Zett., *Suilla affinis* Mg., and *Heteromyza opomyzina* Fln.

HEMIPTERA, etc.—J. M. Brown : There will be plenty of opportunity for entomologists to extend our knowledge of the insect fauna of the district, as although the area should be rich in insect life, I have actually few definite records. Hemiptera were collected on East Witton Fell on the occasion of the Y.N.U. excursion to Middleham in 1926. These were listed in *The Naturalist*, 1927, pp. 24-25. This meagre list could very well be extended, and most of these records refer to quite common species. The following species should occur. *Eupteryx germari* on Scots Fir ; *Conomelus limbatus* among grass ; *Camptozygum pinastri* on Scots Fir ; *Campyloneura virgula* on Oak ; *Orthotylus marginalis* on Salix ; *O. viridinervis* on Elm ; *Pithanus maerkeli* among grass. By the stream side, under the stones *Cryptostemma alienum*, and on stones *Salda scotica*. On the vegetation by the stream Caddis-flies, Mayflies and Stone-flies should be plentiful.

Records (or specimens) of Neuroptera, Psocoptera, Orthoptera, Trichoptera, Ephemeroptera and Plecoptera are greatly desired.

MAMMALIA.—J. P. Utley, B.Sc. : A good average assortment of wild animals should be seen on the excursion. The Red Squirrel has been recorded from Fish Pond Plantation and How Gill Plantation and a good look-out should be kept. Grey Squirrels will probably be seen near Jervaulx. A Fox may be encountered and evidence, with location, of Badger should be noted. Water Voles are almost sure to attract attention by the side of the River Ure.

REPTILIA.—J. P. Utley, B.Sc. : Should the day be dry and warm Adders may be met, particularly on the higher ground. Grass Snake and Slow Worm are likely to be recorded.

ORNITHOLOGY.—J. P. Utley, B.Sc., M.B.O.U. : A wide variety of birds may be seen during the day. Apart from the plantations, the district carries a goodly assortment of trees and some well-founded hedges. Some of the plantations are thick conifers and others are old, open and mixed woodland. There are Willows and Alder by the river and Fish Pond Plantation can be very wet. The Witton Fell Plantation went to supply war needs but the site may carry a larger bird population than it did before. Beyond the Belt Plantations is open moorland. Apart from about 40 common species which should be recorded, observations may give some of the following : Jay, not plentiful ; Goldfinch, may be seen on the lower altitudes ; Lesser Redpoll has been noted ; British Bullfinch may appear near Jervaulx ; Tree Sparrow has been seen ; Corn Bunting has been noted some years ; Yellow Wagtail should be seen on the pasture slopes and Grey Wagtail in the vicinity of Harker Beck or Deep Gill ; Tree Creeper is almost sure to be seen and Nuthatch has been recorded from Lockham Plantation ; Coal Tit and Marsh Tit are not unlikely. Long-tailed Tit is usually recorded and so is Goldcrest ; for a number of years a few pairs of Pied Flycatchers have nested in East Belt Plantation. Wood Warbler may be heard near Jervaulx and the Sedge Warbler at odd places. The Blackcap has been noted but is not common. Ring Ousel may be seen near the head of Sowden Beck and the Wheatear is likely to be seen flitting along the upland walls. Harker Beck should yield a Dipper and possibly a Kingfisher, both Green Woodpecker and Great Spotted Woodpecker have been recorded but I have had no observation of Lesser Spotted Woodpecker. It is possible that the Little Owl will be seen. I have recorded Peregrine Falcon, Merlin and Common Buzzard all from the area at the head of Sowden Beck, the first-named almost certainly on passage. The Common Heron may be observed while Mallard and Teal may both be seen. The Turtle Dove has been recorded occasionally ; Golden Plover are probable on the open moorland. The Coot is not a certainty but has been seen ; Pheasant and Partridge will be noted and care must be taken to avoid disturbing nests and young birds.

MEETING.—Tea will be served at the Blue Lion Hotel at 5 p.m. and this will be followed by a meeting for the election of new members and for the presentation of reports on the excursion from the various sections.

The Next Meeting will be at Strensall on July 9th, 1949.

CIRCULAR No. 497

Yorkshire Naturalists' Union.

President:
Miss L. I. SCOTT, M.Sc., F.L.S., Leeds.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds, 7.

Assistant Treasurer:
Miss L. M. ANDERSON, 48 Denton Avenue, Gledhow, Leeds, 8.

General Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, via Lancaster.

Divisional Secretary:
K. G. PAYNE, B.Sc., A.R.C.S., York.

The 497th Meeting

WILL BE HELD AT

STRENSALL

V.C. 62

On Saturday, JULY 9th, 1949

HEADQUARTERS.—Tea to drink will be provided at Strensall Parish Church Hall at 5-0 p.m. In addition, sandwiches and cakes can be provided for members notifying K. G. Payne, West Dene, Manor Heath, Copmanthorpe, York, that they would like them, not later than 2nd July.

MEETING.—A meeting for the election of new members, and for the presentation of reports, will follow Tea.

ASSEMBLY.—Those arriving in the morning should meet at 11-0 a.m. at the bus terminus in Strensall village. Those arriving in the afternoon should meet at the same place at 1-30 p.m.

TRAVEL.—

TRAINS.	Leeds.....dep.	8-40, 9-15, 10-15, 11-35, 12-50.
	York .....arr.	9-15, 9-52, 11-11, 12-12, 1-28.
	Harrogate....dep.	8-50, 12-35.
	York .....arr.	9-36, 1-24.
	Scarboro' ....dep.	8-10, 10-20, 12-35.
	York' .....arr.	9-9, 11-27, 1-40.

BUSES : Leeds (Vicar Lane) About four buses per hour leave for York.

Harrogate	Buses leave every hour, on the hour, for York.
Scarboro' dep.	7,55, 8-55 and at 25 and 55 mins. past each hour.
York .....arr.	9-44, 10-44 and at 14 and 44 mins. past each hour.

BUSES : York to Strensall.—Double-deckers leave as follows :

York Rly. Stn. :	dep. 25 and 55 minutes past each hour.
Strensall :	arr. 54 and 25 minutes past each hour.

In all cases members are advised to check the times of departure and arrival of trains and buses for themselves.

PERMISSION.—Permission to go on their lands has kindly been given by the following : Mr. Hetherton, for the Sandburn estate (east of the Common) ; Mr. W. H. Stevens, for Great Wood (north of the Common and the railway) ; Mr. Colley, for Walbutts Farm (north of the railway) ; Mr. F. Wright, for the Hermitage (between the main Malton Road and Towthorpe Common) ; Mr. F. R. Woodrow, for Gray Stones Farm (between The Hermitage and Towthorpe Lane), and Mr. L. Brigham, for land also bordering Towthorpe Lane.

MILITARY ACTIVITIES.—The greater part of Strensall Common proper (but not including any of the privately-owned land mentioned above) is an area over which firing takes place. This area is marked by warning notices and by red flags flying when firing is in progress. The Military Authorities inform us that there will be **firing from 4-0 p.m. until 9-0 p.m. on Saturday, 9th July.** Hence members must be out of the danger area before 4-0 p.m. Since the areas which probably are of greatest botanical interest will be within the area over which firing takes place, botanists are recommended to get to Strensall as early as possible. From the point of view of ornithologists and entomologists the fringes of the Common and the privately-owned lands mentioned above are probably of at least as great interest as the military area of the Common.

THE AREA.—Strensall Common is one of the Lowland Heaths of the Plain of York, and, like Skipwith Common and Pilmoor, has an interesting flora and fauna, probably representative of those existing over wider areas of the flat country in earlier times. Also, like Skipwith and Pilmoor, Strensall Common has become progressively drier over the last hundred years owing to drainage. Birch is the predominant tree over most of the area, but there is a deal of bigger timber, especially at the Hermitage. The fringe of the Common at Walbutt's farm contains an interesting boggy area.

The Y.N.U. was last at Strensall on Saturday, 14th July, 1883.

GEOLOGY.—Mr. S. Melmore, B.Sc. : Strensall Common stands about 60 feet above sea-level. The sand which forms such a striking feature of the place is on the average about 5 feet thick, followed by about 20 feet of clay, used on the outskirts of the Common for making bricks. Beneath this clay lie other glacial deposits, the surface of the Trias being about 10 feet above sea-level.

FLOWERING PLANTS.—The areas of greatest botanical interest are probably the wet ones shown north of World's End at the east side of the Common. The large pond near the centre of the Common also is interesting. There was a

very fine show of Buckbean early in May. The following are among the more interesting plants in the records of the York and District Field Naturalists :

Achillea Ptarmica L. (1948).
Andromeda polifolia L. (leaves seen in 1938).
Botrychium Lunaria Sw. (plentiful 1929)
Daphne Laureola L.
Drosera longifolia L. (' fairly common, 1931 ').
Drosera rotundifolia L.
Echinodorus Ranunculoides (L.) Engelm (1932).
Genista anglica L. (1949).
G. tinctoria L.
Gentiana amarella L. (1932).
G. pneumonanthe (fair amount, 1948).
Habenaria bifolia (L.) Br.
Hydrocotyle vulgaris L. (1948).
Lamium Galeobdolon Cr. (1945).
Lycopus europaeus L. (1947).
Menyanthes trifoliata L. (1949).
Montia fontana L. (1903).
Narthecium ossifragum (L.) Huds. (1933).
Ornithopus perpusillus L.
Oxycoccus quadripetalus Gilib.
Pinguicula vulgaris L.
Potentilla palustris (L.) Scop. (plentiful 1949).
Radiola Linoides Roth. (1932).
Serratula tinctoria L. (1933).
Solidago Virgaurea L. (1933).
Triglochin palustris L. (1932).
Utricularia minor L. (1932).
U. vulgaris L. (1933).

The dates are those when the species were last recorded.

Baker (1906) also records :

Bidens cernua L.
Centunculus minimus L.
Equisetum hyemale L. (Hazel bush, Sand Hutton).
Epilobium roseum Schreb.
Hypericum elodes L.
Littorella lacustris L.
Lycopodium inundatum L.
Lycopodium selaginoides L.
Origanum vulgare L.
Peplis Portula L.
Pilularia globulifera L.
Plantago coronopus L.
Rhynchospora alba Vahl.
Scutellaria minor L.
Sparganium minimum Fries.

In general, there is a dearth of recent records from Strensall.

MOSSES.—As long ago as 1894 George Webster wrote deploring the deterioration of the Common brought about ' by the efforts of the military and the agriculturalists.' Nevertheless, in 1903, William Ingham was able to record 70 species of moss from the common as being in his herbarium. These include the following :

Polytrichum commune Hedw. var. *perigoniale*.
Rhacomitricum lanuginosum Brid.
Bryum inclinatum Bland.
B. intermedium Brid.
Dicranum spurium Hedw.
Brachythecium rutabulum B. & S., var. *longisetum*.
Hypnum intermedium Lindb.
H. imponens Hedw.
H. giganteum Schp.
H. lycopodioides Schwaeg.
H. elodes Spruce.
H. Patietiae Lindb.

There seems to have been little or no recent work on the Strensall mosses.

BIRDS.—Mr. F. Jefferson : The actual Common has lost some of the attraction it held in years gone by as an interesting haunt of wild birds, owing to the military's greater monopoly of the central area and the restrictions upon the growth of the heather in the interests of sheep grazing. Mallard and Teal nested in reasonably good numbers forty years ago, but only a few nests of the former, and none of the latter species, may now be found.

Upon this unkeepered expanse, where ' vermin ' is not controlled, the Carrion Crow—to the detriment of other birds—reigns supreme, and it has been stated that nowhere is an area more thickly populated by this bird than here.

The following are included in the list of species which nest on the Common or similar land closely adjacent : Carrion Crow ; Magpie ; Jay ; Greenfinch ; Linnet ; Chaffinch ; Bullfinch ; Lesser Redpoll ; Yellow Bunting ; Reed Bunting ;

Tree Sparrow ; Skylark ; Meadow and Tree Pipits ; Pied Wagtail ; Tree Creeper ; Great, Blue, Cole, Marsh and Longtailed Tits ; Spotted Flycatcher ; Willow, Sedge, Wood, Grasshopper, Garden and Blackcap Warblers ; Greater and Lesser Whitethroats ; Whinchat ; Stonechat ; Redstart ; Nightjar ; Kingfisher (on the Foss at Walbutt's Farm), Green and Greater Spotted Woodpeckers ; Little, Long-eared and Tawny Owls ; Kestrel ; Sparrowhawk ; Woodpigeon ; Stock and Turtle Doves ; Curlew ; Woodcock ; Snipe ; Pheasant ; Partridge.

Stonechats often winter on the Common, where the ground vegetation grows rank, and flocks of Lesser and Mealy Redpolls and Siskins regularly visit the silver birches and alders during the autumn and winter months. The Goldfinch may often be seen where the thistles grow rank. Waxwings and Crossbills have occasionally been recorded on the Common, and the Water Rail and Tufted Duck are sometimes met with.

The sandy hillocks bordering the railway line on the Flaxton part of the Common, are a favourite temporary haunt of the Wheatear, as it journeys in the early springtime to the higher uplands. Upon one occasion the Wheatear was recorded as nesting here.

Writing for the Circular for the 1883 meeting, W. Eagle Clarke had been able to record the Blackheaded Gull and Teal as nesting species.

INSECTS.—The Lepidoptera, of which G. T. Porritt gave a long list for the 1883 Circular, have been well worked since that date by Mr. A. Smith of York. Probably very little has been done at any other order of insects at Strensall.

NEXT MEETING.—July 30th, Brantingham Dale, V.C. 61. This date has been found inconvenient ; it is proposed to alter it to **July 23rd,** please consult that circular.

CIRCULAR No. 498

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General Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, via Lancaster.

Divisional Secretary:
L. JONES, F.R.E.S., 76 Gillshill Road, Hull.

The 498th Meeting

WILL BE HELD AT

BRANTINGHAM DALE

V.C. 61

On Saturday, JULY 23rd, 1949

HEADQUARTERS.—Village Hall, Brantingham, for tea and meeting afterwards. Packed teas may be purchased at 2/- per head, as it is necessary for these to be sent out by caterers from Hull will those intending to purchase tea advise the Secretary in good time. Liquid tea will be available at tea-time but not at mid-day. Persons joining the morning party should pack a mid-day meal.

PERMISSION to visit the Dale, which is strictly preserved, has been granted by Messrs. Todd and Thorpe, Estate Agents, on behalf of Mr. Arnold Reckitt. Members are particularly requested to keep out of sight of the road-way, as much as possible whilst on the private property.

TRANSPORT.—East Yorkshire Motor Services buses leave Hull City Bus Station at 55 minutes past every hour (Selby and Goole bus) and pass through Brantingham village. One exception being the 10-55 a.m. which passes Brantingham Lane end.

Buses of the same Company leave the bus station at 25 minutes past every hour for South Cave, and pass Brantingham Lane end, which is about ten minutes' walk from the village, the fare in each case is 1/10 return from Hull.

MAP.—The area to be visited is shown on sheet 98 of the 1 in. Ordnance Survey 1947 edition, Market Weighton Area.

LEADERS.—Members of the Hull Scientific and Field Naturalists' Club will act as Leaders. The morning party will leave Brantingham village at 10 a.m., the route to be decided by those present. The main parties are expected to arrive in the afternoon when it is proposed to split into two smaller parties, both of which will proceed along the dale to the Church, when one party will take the route up Spout Hill on the East side of the dale and the other the West side. Later the routes will cross and each party will return by the opposite side.

ENTOMOLOGY.—L. Jones : The dale has not been worked to any extent for a number of years and consequently records are very few. This will no doubt tend to make the excursion more interesting for entomologists who will have the opportunity of working new ground.

The dale is an excellent example of Wold country and should yield typical fauna which may be new to those who are not familiar with chalk land.

On both sides of the dale the large patches of willow herb should be examined for larvae of *D. elpenor*. Beating and sweeping will no doubt give good results to lepidopterist and coleopterist.

P. icarus, E. tages, P. malvae, T. sylvestris, A. venator, V. atalanta, W. justina, C. pamphilus, A. hyperantus, D. megera will most probably be seen and perhaps *V. cardui*. Also *P. plantaginis, A. caja* and *L. quercus* v. *callunae*.

No coleoptera records are available but it is interesting to note that one specimen of *Melalontha melalontha*, which is not common in the area, was taken recently.

The Hull Scientific and Field Naturalists' Club would be very grateful of any records made on the excursion for inclusion in Club records.

BOTANY.—Mrs. D. Parish : The wooded hillsides of the dry chalk valley of Brantingham Dale provide the botanist with several species of chalk-loving plants, *e.g. Helianthemum nummularium, Poterium sanguisorba, Reseda lutea, R. luteola, Blackstonia perfoliata, Centaurea scabiosa, Atropa belladonna*, and *Cornus sanguinea*. Of the orchid family, *Listera ovata* grows in large quantities on the lower slopes, *Orchis maculata* occurs in the moister parts, *Anacamptis pyramidalis* is scattered throughout the area, and an occasional plant of *Ophrys apifera* is to be found. *Inula conyza* appears to be increasing in numbers, and last year was fairly common in a plantation of young trees at the top of the West slope towards the Southern end of the dale. *Spiraea Filipendula* should be looked for ; it has been recorded in small numbers.

Flowers of a more general habitat than purely chalk include *Silene cucubalus, Lychnis dioica, L. alba*, and hybrids between the two. *Hypericum perforatum, H. hirsutum, Geum urbanum, G. rivale, Sanicula europaea, Galium mollugo, Euphrasia officinalis, Bartsia odontites, Stachys betonica, Alchemilla vulgaris*, and *Linaria cymbalaria*.

Mentha aquatica and *Symphytum officinale* are amongst the stream vegetation at the lower end of the dale.

ORNITHOLOGY.—G. H. Ainsworth : Brantingham Dale is a game preserve, as a result Warblers and other small passerinae are much more plentiful here than in those places where Carrion Crows, Jays and Sparrow Hawks are left undisturbed.

However, the foliage of the deciduous woods and indeed that of the coniferous plantings will be so thick in July and the bird song so subdued that keen eyes and good-luck will be necessary to obtain a large list of species seen.

Reports have been received of Chiffchaffs being heard in Brantingham Dale—and this bird is a rare breeding species in the East Riding, but Willow Warblers, Lesser and Common Whitethoats, Blackcaps and Garden Warblers breed in this district. This year, 1949, a Nightingale has been heard singing throughout May close to this area.

Finches are numerous in the dale. Hawfinches and Bullfinches have been seen there from time to time. The Tree Sparrow is not uncommon and Redpolls should be seen.

Yellow Wagtails and Pied Wagtails may be noticed. Gold-Crests, Marsh Tits, Long-Tailed Tits and, perhaps, a Willow Tit will be there.

Turtle Doves, Stock Doves and Wood Pigeons are almost sure to be seen.

Maybe someone will be fortunate enough to see a Long-eared Owl. This species has become rather scarce in the area during the past few years, but the other three species of the family Strigidae are not uncommon there.

Spotted Flycatchers and the four commoner species of the family Hirundinidae will be about hawking for flies providing the weather is suitable, but July is a quiet time for ornithologists in Brantingham Dale, which can be so interesting in the spring months.

TEA AND MEETING.—At Headquarters, Village Hall, at 6 p.m., followed by a meeting for the election of new members and a presentation of reports from the various sections.

CIRCULAR No. 499

Yorkshire Naturalists' Union.

President:

Miss L. I. SCOTT, M.Sc., F.L.S., Leeds.

General Secretary:

CHRIS. A. CHEETHAM, F.R.E.S., Austwick, via Lancaster.

The 499th Meeting

WILL BE THE

FUNGUS FORAY

AT

AUSTWICK

V.C. 64

SEPTEMBER 23rd to 27th, 1949

MYCOLOGICAL COMMITTEE.

Chairman : Dr. W. A. SLEDGE, B.Sc., Leeds University.

Recorders : W. G. BRAMLEY, Bolton Percy.
Dr. J. GRAINGER, West of Scot. Agric. Coll., Auchincruive.

Secretary : Miss J. GRAINGER, Wilshaw, Meltham, Huddersfield.

HEADQUARTERS.—Harden, Austwick *via* Lancaster, Miss S. Lovett, Tel. Clapham 211. Terms 15/- per day. Members should write direct, stating what accommodation they require.

TRANSPORT.—Austwick may be reached by bus from Skipton 9-30 a.m., Hellifield 10 a.m., Settle 10-20 a.m., and then hourly 11-30 to 3-30 and 5-30 and 6-30 p.m. There is no bus service from

Clapham Station, but taxis may be ordered from Mr. J. Holmes, Austwick, Mr. Geo. Truelove, Austwick (Tel.) or The Garage, Clapham (Tel.).

EXCURSIONS.—It is proposed to visit Oxenber and Wharfe Woods, Austwick, the woods at Ingleborough Hall, Clapham, and the glens at Ingleton. There are other places near headquarters which can also be worked.

The **Annual Meeting** of the Mycological Committee will be held at Harden on Saturday, 24th September, approx. 8 p.m.; this will be preceded by **The Chairman's Address,** 'Hybridisation in the Fungi.'

By invitation of the Austwick Field Club there will be an Exhibition of Fungi on Monday evening in their Clubroom, the Parish Hall. The public are invited to this Exhibition at 7 p.m.

Persons able to join the Foray for a day should get in touch with Miss Grainger so that arrangements for meeting can be made.

Extra Day Foray. By arrangement with the British Mycological Society a foray will be held on Saturday, 15th October, at Stamford Bridge. Particulars will be available at Austwick or from Mr. J. Webster, B.Sc., Dept. Bot., The University College, Hull. It is hoped that our members will attend this meeting.

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Natural History for the North of England

EDITED BY

W. A. SLEDGE, Ph.D., B.Sc.,

THE UNIVERSITY, LEEDS,

with the assistance as referees in special departments of

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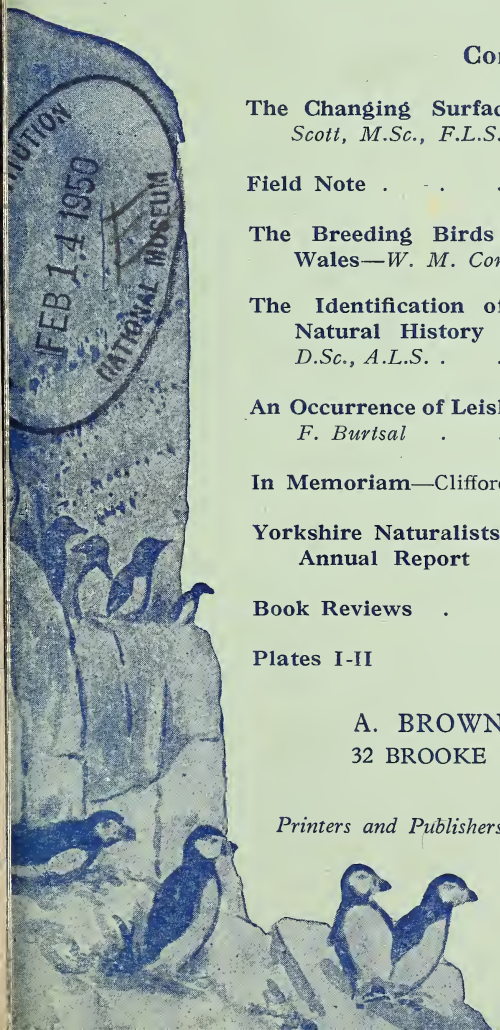

Contents

PAGE

The Changing Surface of the Tree—*Lorna I. Scott, M.Sc., F.L.S.* 1-10

Field Note 10

The Breeding Birds of an Area of Central Wales—*W. M. Condry* 11-16

The Identification of Lichens and Galloe's Natural History of Lichens—*W. Watson, D.Sc., A.L.S.* 17-19

An Occurrence of Leisler's Bat in Essex—*Kenneth F. Burtsal* 19-20

In Memoriam—Clifford Brown, B.Sc.—*S.J.* . 20

Yorkshire Naturalists' Union: Eighty-Eighth Annual Report 21-38

Book Reviews 39-44

Plates I-II

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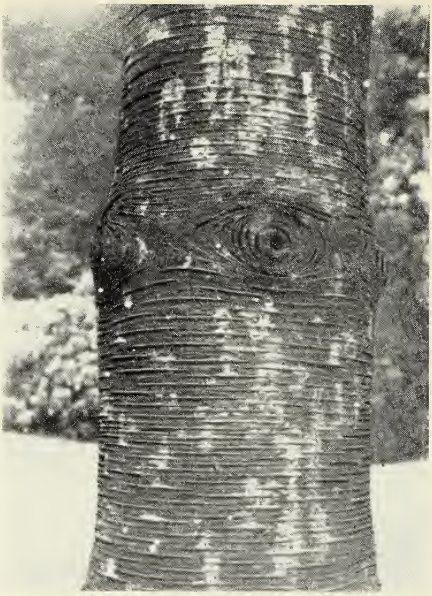

Fig. 1

Araucaria imbricata. To show symmetrical branch scars. The ridges are formed by the leaf cushions. The white marks are resin which has been secreted from the cortex through cracks in the cork.

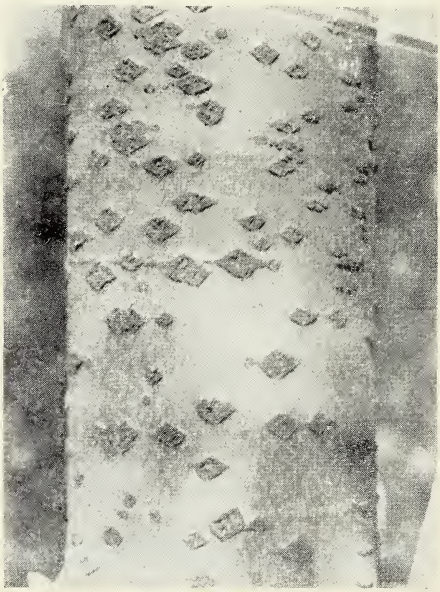

Fig. 2

Populus canescens. A branch with smooth bark in which the lenticels are enlarging prior to fissuring of the surface.

THE NATURALIST

FOR 1950

THE CHANGING SURFACE OF THE TREE

LORNA I. SCOTT, M.SC., F.L.S.

Presidential Address to the Yorkshire Naturalists' Union, Keighley, December, 3rd, 1949.

BEFORE starting on the main subject of my Address, I should like to express to the members of the Union how much I have appreciated the honour you have paid me in inviting me to be your President this year. The invitation from the Secretary came as a complete surprise to me last year, partly because you have not had a woman for President before and partly because I am always happier in the background of a field meeting than in a more public position. For the greater part of the thirty-one years that I have spent in Yorkshire, my association with naturalists, both those of the Yorkshire Naturalists' Union and of my local Leeds Naturalists' Club, has meant a great deal to me ; the finding of friends with similar interests and the help in solving many problems that have turned up in the course of my work are two of the aspects in token of which I have particularly appreciated your invitation. In this connection I should like to mention Mr. Barnett, of the Leeds Naturalists' Club, as he has cut many very beautiful sections of plant material for me and a number of my illustrations for this lecture are photographs of sections cut by him.

I have had a very happy year as President at field meetings, but when it comes to December the choice of a subject for an address to a body of expert naturalists, all with their particular and most varied interests does present a problem. During the year I have been thinking about the way in which the bark of trees develops and I hope that this subject may be one of not too narrow a botanical interest and with some contact with the work of other Sections. The subject is by no means a new one and the main facts were known and worked out by the German botanists and foresters before 1900. Much information is contained in a book by J. Moeller, published in Berlin in 1882. This book has not been translated from the German, but much of the material is used by De Bary in his text-book, of which a good English translation is available. Despite the information in the literature it is often most difficult to find just those points that one would like to know in order to build up a more dynamic picture of the enormous forces at work in a tree and of the resulting changes at the surface as the growth in girth is carried on from year to year. The difficulty arises in part from the fact that there is great variety in the way in which trees deal with this problem ; an attempt to classify trees according to their bark types places in the same group many trees which are widely separated in a system of Natural Classification, whilst at the same time individual trees within a species may show very different surface features. I shall therefore select a few examples to consider in more detail as illustrative of some of the growth features involved.

The plants we are considering are all woody plants which grow in girth from year to year by the activity of a cambium which adds on its inner side a new annual ring to the wood each season and on its outer side a new increment to the bast or phloem. As this growth goes on it is clear that everything outside the cambium must continually be pushed out on to an ever-widening periphery and there must be an enormous strain on the surface tissues. This strain is greatest during the earlier stages of growth of a woody shoot ; for example, in a twig of 3 mm. diameter the perimeter measures 9·5 mm., but if this shoot grows to a diameter of 9 mm. its perimeter will increase to over 28 mm. and the cells of the epidermis or skin will have to stretch to three times their original width or there must be growth and division into three times as many cells. The epidermis is covered by a secretion of fatty material, the cuticle, which has a vital protective function ; it prevents excessive water loss from the inner tissues and also provides an effective barrier against the entry of parasitic fungi. It is known that the germinating basidiospores of the highly specialised rust fungi are able to penetrate the cuticle of very young shoots before the cuticle is appreciably thickened or set to its final varnish-like consistency, but appear to be unable to do so later, whilst the spores

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of the less specialised, facultative parasites are unable to infect the tissues unless the cuticle is ruptured by wounding. It is therefore vital that the epidermis should be maintained intact during girth growth and that the cuticle, that must be weakened and cracked by such intense stretching, should be continually repaired, or else that the epidermis should be replaced by some alternative form of protective surface.

In a certain number of our British trees and shrubs the epidermis is able to grow and keep pace with the growth in girth and we recognise such woody plants as those with twigs that remain green for a considerable distance back. The long straggling shoots of wild or rambler roses are green, or at most with localised

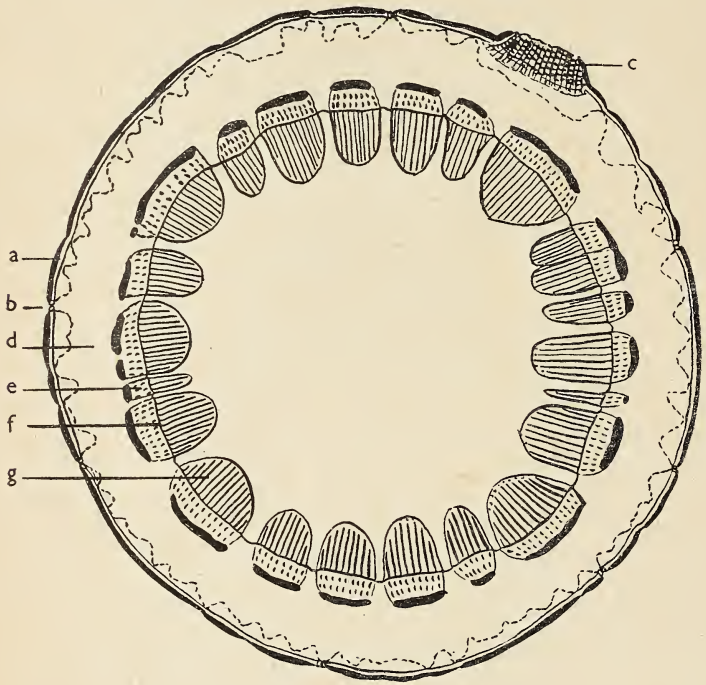

Fig. 1

Rose. Transverse section of a shoot of 3 mm. diameter. (*a*) epidermis ; (*b*) stoma ; (*c*) cork ; (*d*) cortex ; (*e*) bast or phloem ; (*f*) cambium ; (*g*) wood. (×22).

flecks of brown, throughout the current year's growth and to some extent on to the growth of previous seasons ; in spindle (*Euonymus europaeus* L.) the one-year shoots are green except for four brown angles and older shoots remain green to some extent for a considerable number of years, whilst holly (*Ilex aquifolium* L.) may retain the green colour of the twigs for as long as ten years. In all such types the epidermis has kept pace by cell growth and division with the girth growth and the green colour of the underlying cortical cells may be seen through the single layer of living epidermal cells (Fig. 1). The continuity of the epidermis is interrupted in places by the stomata (Fig. 2) ; infection by germinating fungal spores is possible through these pores, but again this appears to be restricted to the more specialised of the obligate parasites and applies particularly to the relatively large uredospores of the rust fungi, which owing to their larger size are able to grow over the surface of the cuticle and if a pore is encountered relatively soon, to turn in and infect the inner tissues in this way. The stomatal pores have been estimated to represent about 1 per cent. of the leaf surface of *Catalpa bignonioides* Walt. and probably the percentage would be considerably lower on

the stem of a woody twig, so that their presence does not reduce the efficiency of the cuticle as a protective layer more than to a limited extent and only in relation to the more specialised parasitic fungi.

Green twigs on woody shoots are the exception rather than the rule and much more commonly it is seen that the twig surface changes to grey or brown about the same time as it ceases to grow in length. The colour changes are seen especially well in the long shoots of elder (*Sambucus nigra* L.) in the late summer and early autumn. The colour change is associated with a new kind of growth leading to cork formation. Living cells of the epidermis, or more often of the next inner or more deeply seated layers of the cortex, or even the outer layers of the bast, begin

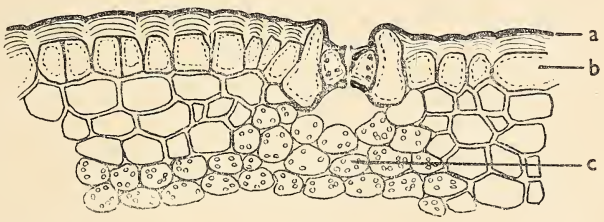

Fig. 2

Rose. Stoma from section shown in Fig. 1. (*a*) cuticle ; (*b*) epidermis ; (*c*) loose tissue of cortex below stoma. (×230).

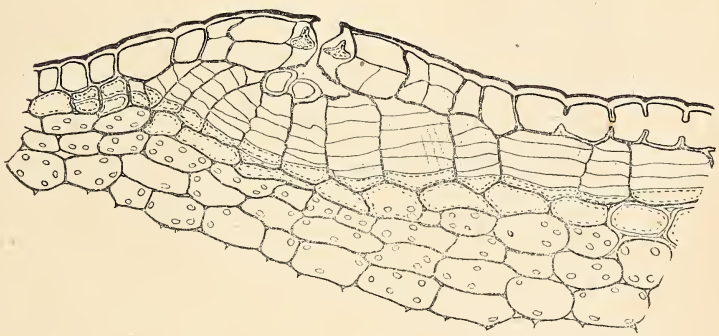

Fig. 3

Peach. Transverse section to show early cork formation beneath a stoma. (×250).

to elongate radially and to divide up into radial series of cells. The cells nearer the inner margin of such series are the ones which divide repeatedly and produce more cells mainly towards the outside, though in some cases cells are also produced to the inner side. The dividing cells are known as the cork cambium and the cells formed to the outside undergo characteristic changes as they become cork ; each cell deposits a lining of fatty material, dies and commonly fills with air. In most cases cork formation starts under a stomatal pore (Fig. 3), where the cork formed is of a looser nature than that which links these first centres of cork formation, though in some plants this difference is less clearly seen in cross sections. The loose corky cells under the pores of the stomata may swell up in moist weather and appear as a light-coloured powder bursting through a slit in the dead epidermis. These positions are the lenticels which are seen easily on nearly all woody twigs. Once cork formation starts at the lenticel positions it usually links up rapidly all round the stem by a sheet of closely-fitting cork cells, though the centres of cork formation may remain curiously localised as brown wings or patches, especially in the plants with predominantly green shoots,

like spindle and rose (Fig. 1). In spindle the cork in one-year shoots forms at the four angles of the stem between the four vertical rows of leaves ; the air in the cork cells is very difficult to displace and often makes the cork wings appear black and indistinct in sections (Fig. 4).

By cork formation a woody shoot develops a tougher and more effective protective covering than it had before. The cork is more than one cell in depth, the cells are closely fitting, except to some extent in the lenticels, each cork cell has a fatty wall layer, no living contents and is commonly air-filled, so that a cork sheet is an almost ideal tissue to reduce water loss, to protect from fungal infection and to insulate the living tissues beneath against temperature changes. Again the problem arises as to whether the only natural breaks in this sheet, the spaces between the more loosely arranged cells of the lenticel, allow of infection

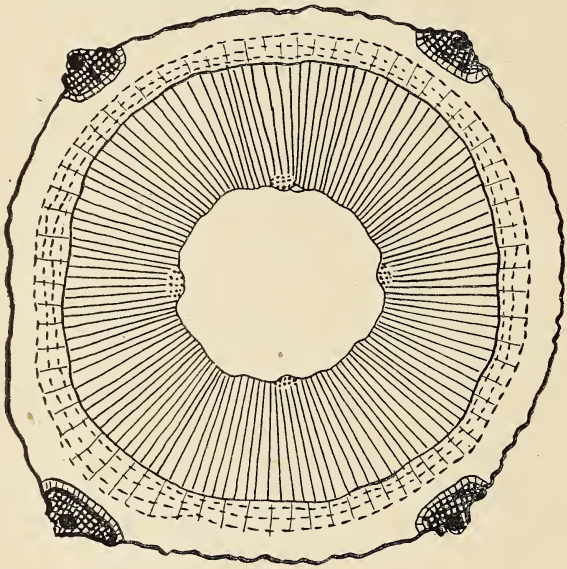

Fig. 4

Euonymus. Transverse section of the twig to show localised cork formation at the four angles of the stem. The cork cells were filled with air. (×12).

by fungi. On this point no definite information appears to be available as books on mycology do not venture an opinion and the forester Büsgen merely states that cork ' cannot be utilised by fungi. Fungi germinating on the surface can therefore penetrate it at the most by the lenticels.' It may be worth while to point out that the spores of fungi are extremely small and the amount of hyphal growth that a spore is able to make without tapping a source of food supply is likely to be limited by its size, so that although the lenticels are greater in area than the stomatal pores and provide a number of small spaces between the more loosely packed cells, the greater depth of the corky layers in these regions of earliest cork formation may preclude the possibility of a germinating fungal spore reaching the living tissues beneath the cork sheet. Many of the less specialised fungal parasites such as many members of the Polyporaceae infect trees through wounds and then digest and feed upon the nutritive tissues of the sapwood and bast and finally break through to the surface to form the spore-producing fructifications. Such fungi will break through the cork sheet at its weakest points such as any cracks, irregularities round the bases of old branches and I think I am right in saying at the weakest points in the cork sheet, the lenticels. I have seen a young fructification of *Polystictus* breaking through a lenticel and I am inclined to think

that this will be found to be common in such cases where the rupture is at a sufficiently early stage for its origin to be recognised.

A tree that has developed a cork cambium may continue to add to the depth of the cork year after year by the activity of the same cambium in much the same way as the wood forms annual increments by the renewed activity of the same cambium each season and also in a somewhat similar way to the formation of annual rings in the wood, the amount of cork added annually may often be recognised by differences in the cork formed early or later in the cork-forming season. The cork cambium itself is a layer of living cells and as such is able to keep pace with the increasing girth of the twig, but the dead cork formed to the outside cannot do so by growth. In birch (*Betula pendula* Roth.) the amount of cork formed each year is very small and the dead cork cells have a surprising and most unusual capacity for stretching, so that as growth in girth takes place the cork stretches and the lenticels are pulled out horizontally into brown, rough strips, many inches across, in the otherwise smooth, white cork sheet. In birch so little cork is added annually and the cells become so flat and tabular that after some 20 to 25 years' growth, the cork sheet is no more than 1 mm. in thickness. The strain on the oldest and outermost cork layers is, however, very severe and even here we find the old cork layers splitting and tearing away along the line of the more fragile cork formed earlier in the cork-forming season as excessively thin, papery sheets. Trees which have a long-lived cork cambium which adds only a small depth of cork each year appear to have smooth surfaces, as on a tree trunk we scarcely notice the separation of tiny thin sheets or powdery cork cells which are slowly lost from the surface ; beech, holly and hornbeam keep the smooth surface throughout life with only few exceptions, whilst a number of other trees have a smooth cork surface for a number of years, but finally break into a rougher bark type. If initials are carved in the cork sheet of a beech, these will last through the life of the tree and in a comparable way the tree records in its cork sheet the history of its branches. For example, in sycamore (*Acer Pseudoplatanus* L.) which is a tree with a smooth surface for many years, the cork sheet is formed on the trunk and on the branches, but if trunk and branch continue to grow in girth the actual surface area in the branch crotch becomes reduced and the inelastic, dead cork is thrown up into folds, especially sharp in the crotch above the branch in a type like sycamore with oblique, upwardly directed branches, but to a less extent all round the branch base. The living cells of the cork cambium are forced to follow these same folds and in this way such folds are perpetuated as a branch scar, long after the branch has gone ; below such a scar a knot will be present in the timber. The branch scar by the arrangement of the sharper and less sharp corky folds indicates the angle of the branch responsible for the scar to the trunk. In birch the branches form a very acute angle with the trunk, the folds are very sharp above the branch, whilst the less sharp folds extend over a greater vertical distance below the branch than in the case of the sycamore. In the monkey puzzle (*Araucaria imbricata* Pav.) the branches stand out almost horizontally from the trunk and the cork folds are symmetrically developed above and below the branch or its scar (Plate I, Fig. 1.) In beech (*Fagus sylvatica* L.) the lower branches of old trees grown in open parkland may droop down, even to the extent of reaching the ground, taking root and layering. The scars of such branches have the sharper cork folds below the branch. On the whole such smooth trees offer a less stable surface for the growth of mosses, algae and lichens so long as the tree is healthy and still growing vigorously in girth as there would be a tendency for epiphytes to be shed with the surface sheets. The relative freedom of healthy birch from epiphytes may be due to the smoothness of the cork sheet or it is also possible that the content of betulin (birch camphor) may have some effect ; betulin is a substance that accumulates in birch bark and accounts to some extent for the white reflecting surface of silver birches. It is said to be distasteful to bark-gnawing rodents. Old beeches have a considerable flora of *Pleurococcus* and encrusting lichens and it would be worth observation to see whether these are present whilst a beech tree is still growing with vigour.

A thin cork sheet will obviously be a less efficient insulating layer than a thick one. Beeches are commonly grown in a relatively close stand or if in open parkland the branches droop and the leaves make an efficient mosaic to shade the trunk, but if beeches from a close stand have their trunks exposed by cutting the lower branches or surrounding trees, the outer tissues are liable to dry out and

split down to the wood causing a damage known as sunscorch. It has been recorded by Vonhausen that on a day with a shade temperature of 30° C. the temperature in the sapwood and inner bast of a beech tree was 45° C. on the sunny S.S.W. side and 31° C. on the N side. Hornbeams, which also have a thin cork sheet, suffer in the same way.

Leaving the smooth trees which form only a little cork annually and lose it imperceptibly, let us consider the trees which have a long-lived cork cambium which adds an appreciable depth of cork annually. In this case the dead cork which forms towards the outside will be pushed out on to a wider periphery by the usual forces at work in the girth growth of the tree and in addition by the very processes of the cork formation itself and is so subjected to very great peripheral

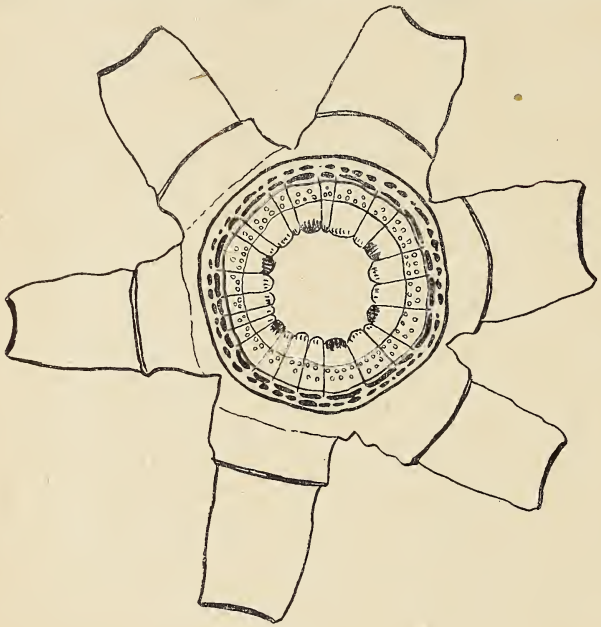

Fig. 5

Acer campestre. Transverse section of a 2-year twig with cork wings. The wood shows two annual rings and the cork two main growth rings.

strain. Very marked effects of this are seen in certain individuals of the field maple (*Acer campestre* L.) with cork wings on the twigs ; this species is most curious in the way in which individuals side by side in the same hedge show very great variation in the amount of cork formed and whilst some produce a great depth of cork, almost equal in depth to the diameter of the rest of the twig in the one shown in Fig. 5, others may produce so little that the twig is almost unwinged. The figure shows two annual rings of wood and the cork formation of two seasons with a line of demarcation of flatter cells at the end of the first season. The cork splits in a characteristic manner and forms six wings which alternate with the six veins which run to the next higher pair of leaves. The cork elm behaves in a similar way.

Other intermediate cases may keep their smooth cork for some years and then, in trees which have not the curious extensible cork of birch, the enormous strain at the surface affects the weakest points in the cork sheet—the lenticels. This is seen well in the enlarging, diamond-shaped lenticels of young grey poplars (*Populus canescens* (Ait.) Sm.) (Plate I, Fig. 2) and in older trees of the same species the cork sheet splits into long fissures which link the lenticels into a network, The black Italian poplar (*Populus serotina* Hart.) is also a beautiful example of a

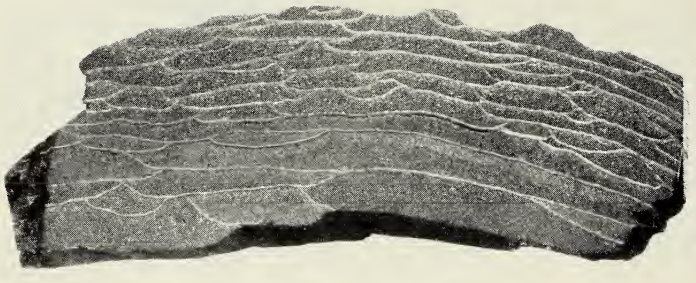

Fig. 1

Pinus sylvestris. Cross section of the old bark to show the thin lines of cork in the bast tissue.

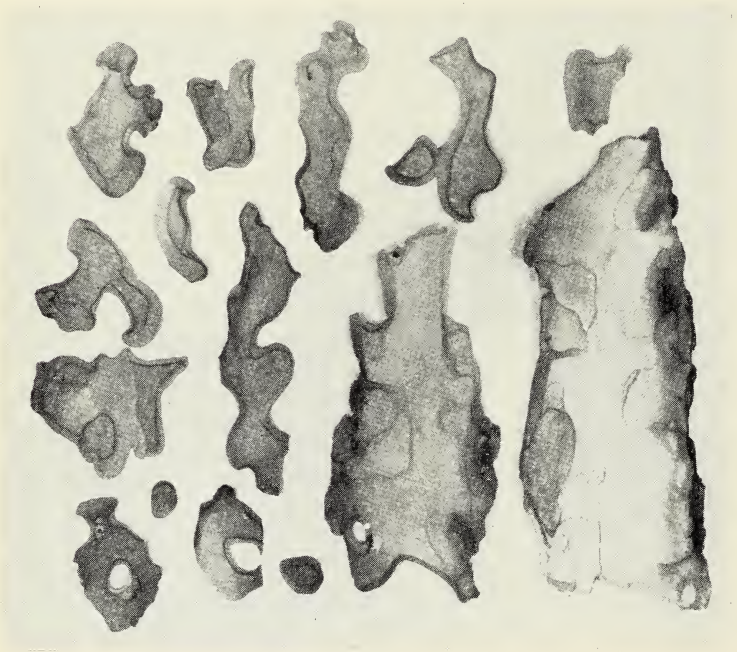

Fig. 2

Pinus sylvestris. Bark flakes. In the lower left of the figure the flakes illustrate the way in which a small outer flake may modify the shape of a deeper flake. The edges of the flakes are bevelled.

deeply fissured surface. The fissures deepen annually and in cities where the surface of the tree becomes blackened, the light colour of the fissures in spring gives an indication that girth growth is starting as is seen in ash trees in Leeds about mid-April.

The best-known tree with deep superficial cork is the cork oak (*Quercus suber* L.). Left under natural conditions this tree develops a very deep, fissured cork sheet, which is added to throughout the life of the tree and de Bary says that he had a piece of such cork 17 cm. thick, that is about 7 in. Deeply fissured cork is useless commercially, so that the outermost cork is taken carefully off the tree when it is about 15 years old and a new cork cambium regenerates a few millimetres below the new surface and this is able to form cork for some 9 to 12 years without becoming too deeply fissured. In narrow twigs we saw earlier that an increase of diameter from 3 to 9 mm. was associated with a trebling of the perimeter, but if a tree with a diameter of 12 in. grew so much that its diameter increased to 13 in. (this in fact would only occur in more than one year's growth), the perimeter would only increase from about 38 in. to 41 in., that is only 1 in 13 approximately. Consequently a regenerated cork sheet is subjected to far less strain and after about 10 years' growth the cork is removed in large sheets and cut into bottle corks and shives, in which the direction of the powdery lines of looser lenticel cork and the growth rings are easily recognised.

Books on forestry draw attention to the relation of the type of trunk surface to its liability to be struck by lightning. Büsgen records that trees such as oak, poplar, pear, elm, willow, acacia and ash are struck the most frequently. In oak in particular the surface does not wet easily, and the thick, fissured surface absorbs the water. Trees with a smooth surface like beech are seldom struck as the water courses freely down over the surface. Some coniferous trees with rough surfaces may also be struck and Edlin refers to a larch which he saw struck and split open with explosive force as the moisture in the trunk was suddenly converted to steam by the sudden rise in temperature.

In some woody plants the cork cambium ceases activity after one season and is renewed each year in deeper layers of tissue, so that each year a separate and completely new ring of cork is formed and as usual everything outside it dies. The old rings of bark split with continued girth growth and hang on as untidy shreds. This is the type of bark formation in some honeysuckles, traveller's joy (*Clematis vitalba* L.) and of particular importance in grape vines. Under the artificial conditions in a greenhouse vines may be attacked by mealy bug (*Coccus adonidum*) and red spider (*Tetranychus telarius*) and the loose rings of old bark provide a safe refuge from insecticides, unless the dead rings of outer bark are stripped off in December before spraying.

The majority of trees form new cork cambia in later years but these are not complete rings as in the climbers just considered, but a succession of shallow, cup-shaped partial cambia which form deeper and deeper into the tissues of the cortex and finally into the bast. The amount of actual cork formation is usually small, but as these new areas of cork form one after another with appreciable depth of bast between them, they build up in time a thickness of dead bark, which is formed largely of dead bast tissue interlaced with thin cork sheets. The sort of bark that is formed is determined largely by the nature of the bast. In Scot's pine (*Pinus sylvestris* L.) the bast is a relatively soft tissue, built of alternating rows of conducting sieve cells (which only function for a limited time and are dead cells with a tendency to collapse in older bast) and living cells, and across this tissue there run out radially the narrow rays of living cells. In the living cells of the bast the new shallow cups of cork cambium form small areas of cork, which is characterised by tough cork to the outside and inside and a layer of very thin-walled, fragile cork in between. As these flakes of bark, each with its limiting layer of cork, are pushed outwards and come under tangential strain, there is nothing in the bast tissue to prevent the separation of flakes of bark which break away in the layer of fragile cork. As the trees become older the tangential strain is less and the flakes accumulate and build up a bark of 1 in. to 2 in. in thickness (Plate II, Fig. 1), but always the oldest flakes at the outside are loosening and can be prised off easily and provide a most fascinating and varied series of shapes (Plate II, Fig. 2). Both surfaces of each flake are bounded by tough cork and all the edges are bevelled owing to the way in which the flakes have overlapped one another to form a perfect, protective surface to the tree.

The redwoods (*Sequoia sempervirens* Endl. and *S. gigantea* Torr.) have attractive bark which is formed in much the same way as that of pine, but with very different final results owing to the different construction of the bast in which the later, partial cork cambia form. In these trees the bast is composed of the same cell types as in the Scot's pine, but in addition the tissue is banded with layers of very thick-walled cells (Fig. 6), which in the vertical direction are long fibres, each one about 3 mm. long and which are linked together to form a network system. The system of fibres prevents much crushing of the bast as it is pushed out on to a wider periphery, but as the conducting elements collapse, the living cells of the tangential bands and also those of the rays enlarge enormously to fill the space and also owing to the enlarging periphery (Fig. 7). It is in this extremely soft,

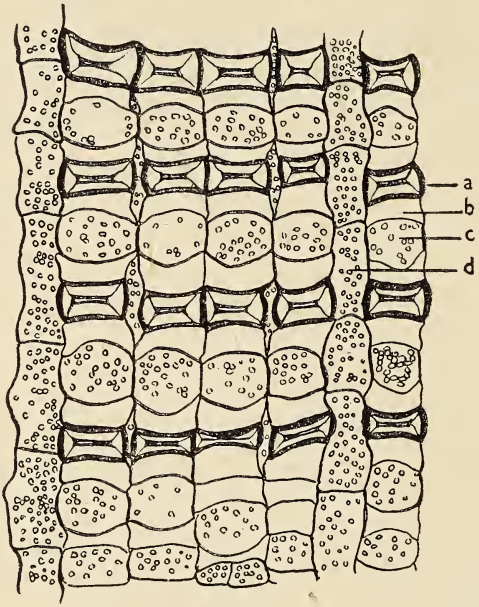

Fig. 6
Sequoia gigantea. Transverse section of the inner bast. (*a*) fibre; (*b*) sieve cell; (*c*) living parenchyma cell; (*d*) ray cell. The living cells contain starch grains. (×165).

spongy, large-celled region of the older bast that the cork cambia arise and form the shallow cups of cork. Outside the cork the tissues all die and the much enlarged cells of the bast collapse. The flakes of bark have been formed much as in pine, but these cannot separate as they are all knit firmly on to the tree by the continuous network system of fibres, so that an extremely loose, fibrous bark of great depth accumulates on old trees, up to 2 ft. in thickness according to St. Barbe Baker for *Sequoia gigantea* growing in its natural habitat in California. The great age of some of the giant redwoods of California is largely due to the bark of these trees which has been building up for thousands of years the great depth of dead, fibrous, air-containing tissue, which provides an excellent insulating layer and one that is almost non-inflammable, so that these trees have survived ground fires that destroyed many other kinds of tree.

Finally, another kind of bark falls somewhere between pine and *Sequoia*. Old trees of sycamore and horse chestnut (*Aesculus Hippocastanum* L.) have a surface irregularly cracked and scaling. As before in these trees new partial cork cambia arise so that new parts of the bast tissue are continually being separated by cork and added to the dead bark. The bast tissues are to some extent fibrous and also contain clusters of hard stony cells interspersed amongst them. The bark flakes

are there, but the fibrous system is sufficiently developed to prevent their free separation as in pine, but they are harder and more brittle in texture than in *Sequoia* and so with time they crack and tend to break away in irregular scale pieces, which are very different from the beautiful, clean-cut and bevel-edged flakes of pine.

Trees with fissured bark often give an indication by the pattern of the fissures of the grain of the underlying timber. In my lecture I showed an example of a walnut tree (*Juglans regia* L.) in which the network of bark fissures was in the form of vertically elongated diamond-shaped meshes and a symmetrically fissured bark of this kind would suggest straight grain of the timber. On the other hand sweet chestnuts (*Castanea sativa* Mill.) grown in parkland in this country very commonly develop a spiral grain, which becomes accentuated as the tree grows in girth. On

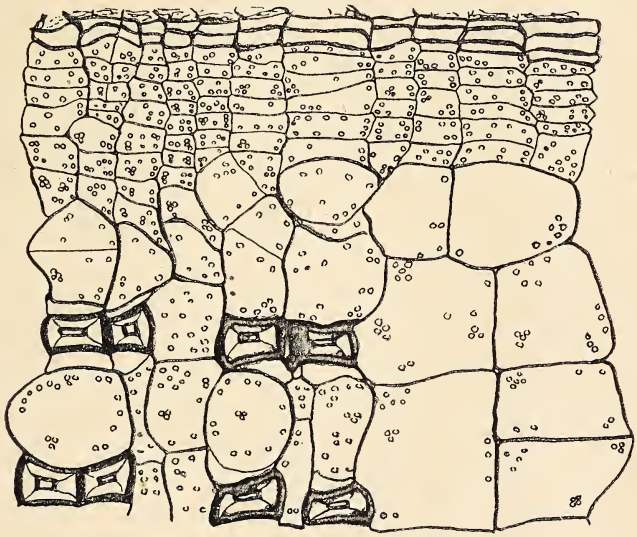

Fig. 7

Sequoia gigantea. Transverse section of outer living bast. The sieve cells have collapsed and the living cells enlarged. The cork cambium at the top of the figure has formed cork to the outside and some living cells towards the inner side. (×165).

the younger tree the bark may begin to fissure in a relatively symmetrical vertical network, but as the fissures deepen into the bast, the fissures have to follow the grain of the tissue and assume a marked spiral tilt.

Rough fissured and scaly bark types afford a more stable foundation for epiphytic mosses, lichens and algae and moisture will be more efficiently held than by smooth types. The surface of trees is separated by inhospitable cork from the nutritive bast and sapwood so that it is not surprising that the majority of plants that grow on tree trunks merely find lodgment there, whilst parasites such as mistletoe that are able to penetrate through bark fissures to the living tissues beneath are exceptional. The majority of the epiphytes will grow indiscriminately upon trees of different species. In a few cases an epiphyte shows preference for a specific host, as for example the lichen *Graphis ramificans* Nyl. on holly, but it is a matter for future study to decide whether such cases are in fact determined by structure or chemistry.

It is somewhat surprising that the bark of trees provides so efficient a protection against gnawing rodents. Rabbits do extensive damage to young trees with relatively smooth bark by eating off the bark and so killing the young trees. When the bark becomes rough and thicker the trees are seldom attacked. Edlin figures a beech of considerable size with the bark eaten by rabbits, which i-

probably related to the thin cork of this tree. It would be of interest to have more precise observations as to the stage of bark development when trees of different species become immune from damage by rodents. The nutritive tissues of the bast would save many animals in hard winters and many types of bark do not give the impression that they would be impossible for a rabbit to gnaw through.

Another case of some interest that has some bearing on bark development is that of the life-cycle of various bark beetles of the group Scolytidae. This is a large group of beetles, the species of which normally confine their attentions to a specific kind of tree. One of these is important as it attacks elms and is the carrier for the Dutch Elm Disease. I am not an entomologist but I have been interested to find that beetles of this group emerge from their winter quarters between about April and June according to the species, the female mates and burrows through the bark of the appropriate tree down to the surface of the sapwood and in a characteristic gallery system of burrows the larvae are reared and finally emerge as beetles through neatly-bored shot holes in the bark. These beetles are not so easily frustrated by bark as the rodents, but a general feature of their attack is that they choose felled or moribund trees and avoid healthy, actively growing trees. I have been wondering whether the tissues provide a better food material when dead or dying, though one would anticipate that healthy tissues formed during active growth would be preferred. It may be that Natural Selection has enforced bark beetles to adopt this habit or the growing larvae might suffer something of the fate of the outer tissues of the tree at this period of the year and be pushed outwards by the enormous force developed by the addition of the new annual increment of wood which is sufficient to tear the tough corky layers of the bark into the ever-deepening fissures.

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Note.—Since giving my Address at Keighley, Mr. H. Whitehead has kindly provided me with some useful records of trees struck by lightning. The data support the view that trees commonly struck have rough bark ; oak, poplar (the species not always stated), ash, elm and a number of coniferous trees hold numerous records, whilst beech and birch occur near the bottom of the frequency list.

Mayflies Mistake. About 8-30 p.m. (summer time) on July 11th a friend called me out to see a very large number of Mayflies which were flying in the roadway. As some were dropping on to the road surface he attempted, though unsuccessfully, to catch some and then came along for a net. In the net it was evident that practically all were carrying egg masses which they were depositing on the road surface, mistaking it for a stream. Where the insects were most numerous the road has high walls on each side. The insect swarm commenced about 30 yards from a bridge over a stream and extended some 150 yards further. The species was *Ephemerella ignita* Poda., which has been seen on the stream from June to October. Mayflies and Stoneflies have frequently been seen on roads still further from water and evidently making the same mistake. In the *Proc. Leeds Phil. Soc.*, 1928, Percival and Whitehead published a note on the oviposition of this species. They were not satisfied as to whether the insect came on to the water surface or if it dropped the egg mass, but on the road the insects certainly did alight.—C. A. Cheetham.

THE BREEDING BIRDS OF AN AREA OF CENTRAL WALES
(A Report to the West Wales Field Society, by W. M. Condry)

No. 1. THE GENERAL NATURE OF THE AREA SURVEYED.

The area covers some sixty square miles, mainly in North-east Cardiganshire, but including part of the Plynlimon District of Montgomeryshire, and is contained roughly in the triangle between Plynlimon, Capel Bangor and Cwm Ystwyth. It is very mixed country, ranging from estate-woodland (Capel Bangor, 200′) ; planted hillside timber (lower Rheidol and Ystwyth Valleys, 400-′800′) ; rather scrubby, steep, rocky oak-hangers (Devil's Bridge, 600′-800′), and rough semi-cultivated hill-land (300′-1,000′), to open moorland (Plynlimon, 1,000′-2,468′). At its nearest point (Capel Bangor) the area is six miles from the coast.

No. 2. ECOLOGICAL DIVISIONS.

For convenience, the widely-varying habitats have been reduced to seven main groups.

I. Hill Pasture (800′-2,468′) :—
- (a) With grass and other low vegetation only.
- (b) With isolated thorns, rowans, pines, etc.
- (c) With loose walls, screes or buildings.
- (d) With areas of rush and sedge.
- (e) With bracken.
- (f) With gorse.
- (g) With isolated groups of trees.

II. Upland Heather Tracts (1,000′-2,000′).

III. Rock Faces of all sizes.

IV. Lakes and Pools.

V. Stream Sides.

VI. Woodland :—
- (a) Forestry Commission plantings (900′-1,300′).
- (b) Indigenous sessile-oak woods (600′-800′).
- (c) Planted hanging woods (400′-800′).
- (d) Lowland estate-timber (200′-400′).

VII. Rough Agricultural Land (300′-1,000′).

No. 3. THE BREEDING BIRDS, GROUPED UNDER THESE ECOLOGICAL DIVISIONS.

I. Hill Pasture (800′-2,468′) :—
- (a) With grass cover only—Skylark, Meadow Pipit, Cuckoo, Golden Plover.
- (b) With isolated thorns, rowans, pines, etc.—Raven, Carrion Crow, Magpie, Chaffinch, Tree Pipit, Buzzard.
- (c) With walls, screes or buildings—Raven, Jackdaw, House Sparrow, Grey Wagtail, Pied Wagtail, Great Tit, Blue Tit, Spotted Flycatcher, Ring Ouzel, Wheatear, Redstart, Robin, Wren, Swallow, House Martin, Tawny Owl, Barn Owl, Kestrel, Stock Dove.
- (d) With marshy areas overgrown with rushes—Reed Bunting, Meadow Pipit, Grasshopper Warbler, Whinchat, Cuckoo, Short Eared Owl, Curlew, Snipe, Lapwing.
- (e) With bracken—Yellow Bunting, Whinchat.
- (f) With gorse—Linnet, Yellow Bunting, Meadow Pipit, Whinchat, Stonechat, Cuckoo.
- (g) With isolated groups of trees—Raven, Carrion Crow, Magpie, Chaffinch, Goldcrest, Long Eared Owl, Tawny Owl, Kestrel, Buzzard, Wood Pigeon.

II. Upland Heather Tracts (1,000′-2,000) :—
Skylark, Meadow Pipit, Merlin, Red Grouse.

III. Rock Faces :—
Raven, Carrion Crow, Jackdaw, Pied Wagtail, Spotted Flycatcher, Pied Flycatcher, Ring Ouzel, Wren, Barn Owl, Peregrine Falcon, Kestrel, Buzzard, Wood Pigeon, Stock Dove.

IV. Lakes and Pools :—
Dunlin, Common Sandpiper, Mallard, Teal, Black Headed Gull, Moorhen.

V. Stream Sides :—
Grey Wagtail, Dipper, Sand Martin, Common Sandpiper.

VI. Woodland :—

(*a*) Forestry Commission Plantings (900′-1,300′) :—
Carrion Crow, Magpie, Jay, Lesser Redpoll, Chaffinch, Yellow Bunting, Tree Pipit, Meadow Pipit, Coal Tit, Goldcrest, Willow Warbler, Grasshopper Warbler, Blackcap, Whitethroat, Song Thrush, Ring Ouzel, Blackbird, Whinchat, Stonechat, Robin, Hedge Sparrow, Wren, Cuckoo, Short Eared Owl, Wood Pigeon, Blackcock.

(*b*) Indigenous oakwoods (600′-800′) :—
Carrion Crow, Jackdaw, Chaffinch, Great Tit, Blue Tit, Coal Tit, Pied Flycatcher, Wood Warbler, Mistle Thrush, Song Thrush, Blackbird, Redstart, Robin, Wren, Tawny Owl, Buzzard, Sparrow Hawk, Wood Pigeon, Stock Dove.
Note.—It should be noted that Woodland Type (b) and sometimes (c) also, are usually unfenced woodlands grazed in by sheep. They therefore lack undergrowth suitable as cover for several species which would otherwise breed there, for these breed on much higher ground in the thick cover afforded by fenced conifer-plantations (Woodland Type (a)).

(*c*) Planted hanging woods (400′-800′) :—
As (b) above, with addition of Raven, Tree-Creeper, Nuthatch, Chiffchaff, Blackcap, Greater Spotted Woodpecker, Jay, Blackbird, Song Thrush, Mistle Thrush.

(*d*) Lowland Estate Timber (200′-400′) :—
As (*c*) above with addition of Rook, Greenfinch, Bullfinch, Marsh Tit, Garden Warbler, Nightjar, and Kestrel, but normally lacking Pied Flycatcher, Wood Warbler and Redstart.

VII. Rough Agricultural Land (300′-1,000′) :—
Carrion Crow, Rook, Jackdaw, Magpie, Greenfinch, Goldfinch, Linnet, Chaffinch, Bullfinch, Yellow Bunting, House Sparrow, Wood Lark, Sky Lark, Tree Pipit, Meadow Pipit, Pied Wagtail, Great Tit, Blue Tit, Marsh Tit, Long Tailed Tit, Spotted Flycatcher, Pied Flycatcher, Willow Warbler, Garden Warbler, Whitethroat, Mistle Thrush, Song Thrush, Blackbird, Wheatear, Redstart, Robin, Hedge Sparrow, Wren, Swallow, House Martin, Sand Martin, Swift, Cuckoo, Little Owl, Tawny Owl, Barn Owl, Buzzard, Wood Pigeon, Stock Dove, Lapwing, Curlew, Snipe, Corncrake, Partridge.

No. 4. ANNOTATED LIST OF THE BREEDING BIRDS. (Figures in brackets after each name refer to the ecological divisions (Section 2) in which the species breeds).

Raven (Ib, c, g ; III ; VIc, d). Plentiful and increasing. Breeds from sea-cliffs to highest inland crags, especially about rocky heads of hill-valleys. Not truly a woodland breeder but nests freely in small clumps or rows of trees, especially in lowland parkland, where even close to main roads. Two cases of nests in rookeries. Always ready to occupy new sites, as isolated trees, old mine-buildings or machinery. Nests nearly always difficult of access. One record of nest down mine-shaft. Communal roost even in breeding season on Dyfi estuary.

Carrion Crow (Ib, g ; III ; VIa, b, c, d ; VII). Very numerous wherever there are trees, even to stunted isolated rowans, and birches on bare moorland up to 1,600′. Above that, breeds sparingly in crags and rocky stream-sides. Has lately taken to Forestry Commission plantations and two records from elsewhere of nests in upturned birch-brooms stacked for fire-beating.

Rook (VId ; VII). Breeds only on or near lowland estates, but feeds mainly on moorlands late summer and autumn.

JACKDAW (Ic ; III ; VIb, c, d ; VII). Chiefly a lowland bird, not breeding much higher than 800′. In hills nests mainly in rocky gorges or old mine buildings ; in lowlands, quarries, hollow trees and chimneys, even of occupied houses, are most favoured sites.

MAGPIE (Ib, g ; VIa ; VII). Breeds wherever there are thorns to any altitude. (Nests 3′ from ground in very thick blackthorns on sea-cliffs.)

JAY (VIa, c, d). Mainly in lowland woods, but spreading to high conifer plantations.

GREENFINCH (VId ; VII). Breeds plentifully in loose colonies in and around lowland estates and gardens. Much less common in higher villages and not found away from habitations. Absent above 800′.

GOLDFINCH (VII). Mainly in lowland estates, gardens and orchards, but a very few scattered in rough agricultural country up to 800′ and perhaps higher.

LESSER REDPOLL (VIa). Small colony has bred in one conifer forest (1,050′) for last few years and odd birds recorded from similar forests. (Rare elsewhere in Wales.)

LINNET (If ; VII). Generally distributed, but almost entirely in gorse-patches, up to 900′. Communal.

BULLFINCH (VId ; VII). Not numerous. Confined to lowland hedgerows and borders of woodlands.

CHAFFINCH (Ib, g ; VIa, b, c, d ; VII). Very common. Nests into hills as high as groups of thorns or other trees persist. But not attracted by purely isolated thorns on open moorland.

HOUSE SPARROW (Ic ; VII). Numerous in villages up to 1,000′. Not higher in this area. Mainly absent from upland isolated farms even below 1,000′.

YELLOW BUNTING (Ie, f ; VIa ; VII). Mainly on higher ground (600′-1,200′). Gorsey or brackeny slopes, roadsides, etc. (where fences or bushes offer singing-posts). Takes well to new conifer-plantations.

WOODLARK (VII). Plentiful in rough open country up to 900′. Absent from moorlands.

SKYLARK (Ia ; II ; VII). Though breeding on lowlands, misses the valleys and re-appears on grassland from *ca.* 1,000′-2,400′. Plentiful but nowhere equals numbers of Meadow Pipit.

TREE PIPIT (Ib ; VII). On high ground only, much as Yellow Bunting. As high as hawthorn scrub persists or new conifer plantations (1,300′).

MEADOW PIPIT (Ia, d, f ; II ; VIa, VII). Common all over moorlands. Less so on lower ground. Scarce in rich agricultural areas of coastal plain. Most numerous in high valleys, especially where conifers newly-planted.

GREY WAGTAIL (V). Mainly on middle reaches of streams where there is cover of trees, but a few pairs breed well above tree-line, especially about old mine-workings, up to 1,300′.

PIED WAGTAIL (Ic ; III ; VII). Evenly distributed wherever there are buildings. At all moorland farms and deserted mines. Sometimes in rocks away from habitations.

TREE CREEPER (VIc, d). All deciduous woods, chiefly in lowlands.

NUTHATCH (VIc, d). Similar distribution to Tree Creeper but less common, especially on higher ground.

GREAT TIT (VIb, c, d ; VII). In and about deciduous woods, farms, gardens, etc., especially in lowlands. Occasionally about hill-farms.

BLUE TIT (VIb, c, d ; VII): As Great Tit, but commoner.

COAL TIT (VIa, b, c, d). Thinly distributed in all types of woodland. Probably more in higher woods especially oak-hangers. The only Tit of the conifer plantations because of its willingness to nest in holes in the ground.

MARSH TIT (VId ; VII). Rare except in lowlands and only thinly distributed there.

LONG TAILED TIT (VII). Confined to lowlands and scarce since winter of early 1947.

GOLDCREST (VIa). Most numerous in high conifer plantations. Had recovered quite well by second summer after severe reduction in 1947.

SPOTTED FLYCATCHER (Ic ; III ; VII). Abundant, especially about lowland villages and estates. But widely scattered even to highest uninhabited moorland farms in good seasons (up to 1,400′).

Pied Flycatcher (VIb, c ; VII). Characteristic of the indigenous oak-hangers and other deciduous woods from 500′-800′. occasionally lower. Outside woodland, will breed along streams, even in villages, where there are a few suitable trees. Nests in holes in rock faces occasionally.

Chiffchaff (VIc, d). A lowland bird, extending thinly to 600′. Rarely higher.

Willow Warbler (VIa, b, c, d ; VII). Plentiful. Less common in coastal plain. Most numerous 400′-1,000′ where suitable cover exists, especially in high conifer plantations up to 1,200′. Avoids interior of steep oak-hangers where replaced by Wood Warbler.

Wood Warbler (VIb, c). Constant associate of Pied Flycatcher but tends to range lower. Oak-hangers and mixed woods.

Grasshopper Warbler (Id ; VIa). Practically confined to ground between 800′-1,100′. Nests sparingly in patches of rush, heather, gorse, but especially young conifer plantations.

Garden Warbler (VId ; VII). Chiefly about lowland woods and thickets, but ascends cultivated valleys sparingly not much beyond 900′.

Blackcap (VIa, c, d). More numerous than Garden Warbler and breeds sparingly in conifer-plantations up to 1,000′.

Whitethroat (VIa ; VII). General in agricultural country. Upper limit 1,100′ in conifer plantations, where it is more numerous than anywhere else.

Mistle Thrush (VIc, d ; VII). Generally distributed about scattered trees or edges of woodland from lowlands to *ca.* 800′. Still scarce since being nearly wiped out in early 1947.

Song Thrush (VIa, b, c, d ; VII). Numerous wherever suitable cover. Up to 1,100′ in Forestry plantations.

Ring Ouzel (Ic ; III). Breeds mainly on rocks covered with heather or ivy, high up valley-sides or just over streams. Occasionally in walls or mine-shafts. Particularly numerous about forestry plantations : singing, feeding, roosting and possibly in some cases nesting, in the young trees.

Blackbird (VIa, b, c, d ; VII). Common. Normally breeding higher in the hills than Song Thrush, above the tree-line in rocks with some vegetation on them. At present—since 1947 the Blackbird in this area has been much reduced—it does not go as high as the Song Thrush, and just about reaches the Ring Ouzel's range, instead of overlapping with it.

Wheatear (Ic ; VII). Breeds, in this particular area, on the moorlands only from 900′-2,000′, near habitations, on roadsides, bare slopes, or remote moorland. Favourite nest-site is bank of earth topped by slabs of slate where old wall has been. Also screes, buildings and loose stone walls.

Whinchat (Id, e, f). Plentiful on high ground. Very few on lowlands, in marshes. Patchily spread even in hills, breeding typically in rush-grown patches of marsh, especially where tiny evergreens have been planted, from ca. 700′ to 1,600′. Availability of fencing, small trees, etc., as perches, a great attraction, but not essential. Occasionally in cover of gorse or bracken.

Stonechat (If ; VIa). Essentially a coastal species, it breeds here and there about the hills, but was wiped out inland in early 1947, and had not recovered by the second summer. Persists among very small conifers where gorse has not been eradicated.

Redstart (Ic ; VIb, c ; VII). Locally plentiful within a rather narrow altitudinal range. (Mainly 400′-800′.) Breeds in ruins, farm buildings, and holes in trees. Typical of waysides, some upland farms and the hanging-oakwoods. Tends to breed in loose colonies or groups.

Robin (Ic ; VIa, b, c, d ; VII). Common in vicinity of trees or habitations. Some in conifer-forests up to 1,100′. Usually absent from highest moorland farms, certainly if deserted, and isolated woods or belts of trees. Never at old leadmines.

Hedge-Sparrow (VIa ; VII). Common in agricultural land especially near gardens or farms or edges of woodland. Numerous up to 1,100′ in conifer-forests.

Wren (III ; VIa, b, c, d ; VII). Numerous even to the heads of rocky valleys above the tree-line, where it breeds in crevices, usually under cover of slight vegetation such as ivy-stems. Breeds throughout forestry-plantations. Wiped out on high ground in early 1947 and by end of second summer had made only a partial recovery up to 1,000′ and not higher.

DIPPER (V). Characteristic of all main and side streams, but not usually nesting much above 1,000′, though occasionally to 1,200′. Highest bird seen is 1,500′, but not breeding at that height.

SWALLOW (Ic ; VII). Breeds about most farms, lowland or upland. In good years even at high ruined farms up to 1,100′ but fluctuates noticeably.

HOUSE MARTIN (Ic ; VII). Widely distributed about villages but majority from 700′-900′, some at farms at 1,000′, and one colony outside this area at 1,300′. Like the Swallow, subject to fluctuations.

SAND MARTIN (VII). Several colonies along lower reaches of the streams. Also in gravel-pits up to 1,100′.

SWIFT (VI). Breeds in villages. Not noted at isolated houses or farms. Absent in this area above 750′, though feeding over highest moors.

NIGHTJAR (VII). Scarce. Breeds on lowest slopes of the hills where they descend to coastal plain.

GREAT SPOTTED WOODPECKER (VIc, d). Fairly well established in deciduous woods except in steep gorges covered with scrub-oak.

CUCKOO (Ia, d, f ; VIa ; VII). Parasitises Meadow-Pipit almost exclusively. Especially common in hill-valleys. Absent almost entirely from open moorland. Infrequent on lower ground.

LITTLE OWL (VII). Scarce. A few pairs about edges of estates. Confined to lowlands.

LONG EARED OWL (Ig). Scarce. Apparently confined to isolated plantations or belts of conifers on open moors.

SHORT EARED OWL (Id). Scarce. Breeds on open moorland in rush-grown, marshy places. Faithful to old haunts even after planted with young conifers.

TAWNY OWL (Ic, g ; VIb, c, d ; VII). Common wherever there are trees and will occasionally nest in old mine-buildings.

BARN OWL (Ic ; III ; VII). Not common. Will breed in highest deserted houses and mines, *i.e.* 1,400′. Also occasionally in rock-faces.

PEREGRINE FALCON (III). Several regular eyries, actual site of nest varying sometimes. Usually inaccessible. Sometimes uses old Raven nests. Eyries in this area 7-8 miles apart. Other seemingly suitable sites available but not used.

MERLIN (II). Occasional only. No breeding record in last ten years. Probably decreasing.

KESTREL (Ic, g ; III). Generally well distributed but not common in remotest parts of hills. Most about sea-coast and lower hills. Breeds in cliffs, old mine-buildings and isolated groups of trees.

COMMON BUZZARD (Ib, g ; III ; VIb, c, d ; VII). Numerous and widespread. Builds in trees of all sizes in lowlands, usually in woods. In hills, half of nests are in trees, half in rocks. Rock-nests usually on easily-reached ledges supported by heather, etc., on rocky sides of streams, rather than on high commanding crags. Rock-nests mainly 1,200′-1,700′. Very often in isolated groups of trees on moorland or even in single small trees at times. Also very characteristic of hanging deciduous woods. Flourishing and increasing and has now spread from West Wales as far east as Worcestershire and Warwickshire.

SPARROW HAWK (VIb, c, d). Quite well established in woodlands mainly below 800′.

MALLARD (IV). Breeds on lowland marshes near this area and, as pairs are usually about hill-pools, probably a few breed but this wants confirmation.

TEAL (IV). A few pairs breed at the only three lakes with suitable cover, from 1,060′ to 1,700′.

GREAT CRESTED GREBE (IV). A pair bred 1949 on a pool in Cardiganshire at 800′ above sea-level. Two broods reared. First breeding record for the county.

LITTLE GREBE (IV). Breeds on a few pools up to 800′.

WOOD PIGEON (Ig ; VIa, b, c, d ; VII). Breeds wherever there are woods, thickets or tall hedges. Does not nest in isolated trees or thorns in the hills but does in spinneys or wind-breaks to any height. In rocky wooded valleys will breed in ivy-clumps against rocks. Abound in conifer-forests from 10-12 years after planting.

STOCK DOVE (Ic ; III ; VII). Locally not uncommon. Tends to be sociable. Seems to breed exclusively in old buildings and rock-faces, not in trees, in hill-country. Breeds in thick interiors of limes on coastal plain. Not over 900′.

Golden Plover (Ia). Scarce. Usually a few pairs on open moorland above *ca.* 1,800′.

Lapwing (Id ; VII). A few nest on marshes at a little over 1,000′ but mainly prefers lower ground, especially ploughlands. By no means very numerous. Some evidence that it formerly bred commonly on moors where now absent last 15 years.

Dunlin (IV). Occasional. *Very* thinly distributed on upland marshes in Mid-Wales.

Common Sandpiper (IV ; V). Breeds by nearly all moorland lakes, reservoirs and streams.

Curlew (Id ; VII). Characteristic marsh bird from sea-level up to 1,200′, rarely higher, and majority of nests about 1,000′. Thus Curlew is bird mainly of moorland fringe and also breeds in smaller numbers on lower ground in damp pastures, any rough ground, and sometimes among sprouting corn.

Snipe (Id). Probably slightly fewer breeding than Curlew whose territory it often shares, for although it ranges higher (up to 1,650′) and breeds down to coastal marshes, is not seen much on intervening agricultural land.

Black-Headed Gull (IV). One colony only in this area at present, on a lake at 1,075′. A small number nested annually on an island in one of the other lakes (1,060′) until 1940. Several colonies within ten miles outside the area.

Landrail (VII). Scarce where formerly common. A pair or two each year breed in hayfields at about 800′, presumably successfully, as hay not normally cut there until late July or August, and then often by scythe. Signs of slight increase 1949.

Moorhen (IV). Confined to small lowland pools. One record of a bird seen June 10th on lake at 1,500′.

Black Grouse (VIa). Scarce. Possibly increasing slightly where it has taken to cover of larch plantations.

Red Grouse (II). A few unpreserved pairs in most heather tracts from 1,300′-1,800′. Believed to be slowly dwindling.

Common Partridge (VII). Scantily spread over rough agricultural ground up to 1,000′. Has decreased over last 20 years.

No. 5. CONCLUSION.

The area surveyed gives a representative cross-section of West Wales from the inner edge of the coastal plain to the summit of the central moorlands (*i.e.* from 200′ to 2,468′).

The bird-list illustrates the strength of many species by no means universally common elsewhere : Raven, Wood Lark, Grey Wagtail, Nuthatch, Pied Flycatcher, Wood Warbler, Ring Ouzel, Wheatear, Whinchat, Redstart, Dipper, Peregrine Falcon, Buzzard, Common Sandpiper, Curlew. The following, on the other hand, widely distributed in England and the Welsh Marshes, fail in their westerly distribution before reaching Cardiganshire : Starling, Hawfinch, Tree Sparrow, Corn Bunting, Yellow Wagtail, Willow Tit, Red Backed Shrike, Lesser Whitethroat, Lesser Spotted Woodpecker, Green Woodpecker, Long Eared Owl, Turtle Dove, Woodcock.

All these absentees are also absent or nearly so from Ireland, except : Starling, Corn Bunting, Long Eared Owl, Woodcock.

In Mid-Wales the Starling breeds on the coast only, in towns and villages. The scarcity of the Long Eared Owl is particularly surprising in view of the fact that it is Ireland's commonest Owl.

The importance of upland conifer afforestation should be noted, as this means an influx of many species normally absent from high ground.

These plantations all planted within about the last twenty years have, in some cases, thriven but patchily, so that instead of trees of uniform growth, there results a considerable variety of habitats ranging from impenetrable thickets of 25′ spruce to stunted bushes (usually in marshes or high-up slopes), often tangled amongst *Molinia* grass and other vegetation. Hence the wide variety of species that find congenial breeding-grounds within these plantations. The bird-population of these plantations slowly changes as new ecological factors set in with the growth of the trees, thinning, felling, replanting and drainage, that constantly go on.

This report should be read throughout in the light of the fact that many species have not yet recovered from the record cold spell and blizzards of early 1947.

THE IDENTIFICATION OF LICHENS AND GALLOE'S NATURAL HISTORY OF LICHENS

W. WATSON, D.SC., A.L.S.

When a student takes up the study of lichens it is advisable to have some help in the field and laboratory from an experienced lichenologist in addition to that given by books dealing with them by descriptions, illustrations and keys. Such books are usually concerned with the lichens of a particular country and our country fortunately possesses some good manuals (see later references) especially those of Miss Lorraine Smith. Many of the specific names of lichens were given by the older authors of the latter part of the eighteenth century and the early part of the nineteenth. The technique of these authors was too simple and their instruments inadequate to deal with the lichen as it would be dealt with to-day when its microscopic structure has such importance. Many of the descriptions of these early lichenologists were incomplete and an author of a species sometimes included specimens in it which do not conform to the present-day concept of the species. In fact the description of the species may have been made from the examination of several plants which are separated to-day into several species.

Dr. Olaf Galloe, the Danish lichenologist, was quite aware of these difficulties. He rightly stated that the majority of species dating from earlier times were not based on single specimens but that the author, in most cases, compiled his description after an examination of several specimens and, by so doing, undoubtedly formed a description based upon a collective species which would no longer be considered to be an elementary species. He also wrote that ' if one were to submit to the earlier lichenologists a whole collection of species, which are well separated at the present time, they might determine them as one species.' These considerations cause some difficulties in determining a lichen specimen by the usual methods of comparison with its description and with a type specimen. Galloe therefore suggested that the difficulties might be overcome if an international institute was ' established where all the type-specimens of the world were gathered together and where, for all time to come, all new species were registered.' As this did not seem likely to occur, he determined to write a description of each Danish species based on a single individual with full details of its morphology and anatomy. If it seemed desirable to do so, several plants could be examined and separate descriptions and illustrations given for each plant.

In 1927, Part I of the *Natural History of the Danish Lichens*, by Dr. Galloe, was published and nine other volumes were intended to complete the series. Six of these (Parts II-VII) have since been issued. Part I deals with species of *Lecidea*. Part II, published in 1929, deals with species of *Psora*, *Biatorina*, *Catillaria*, *Bilimbia* and *Bacidia*. Parts III and IV were published in 1932 and deal with species of *Lecanactis*, *Gyalecta*, *Biatorella*, *Mycoblastus*, *Rhizocarpon*, *Buellia* and *Lecanora*. Part V, published in 1936, deals with species of *Ochrolechia*, *Aspicilia*, *Lecania*, *Candelaria*, *Candelariella*, *Acarospora*, *Pertusaria*, *Caloplaca*, *Diploschistes*, *Thelotrema*, *Phlyctis* and *Rinodina*. Part VI, published in 1939, deals with species of *Peltigera*, *Leptogium*, *Collema* and other members of the Peltigerales group. Owing to the war Part VII did not appear till 1948. It deals with the fruticose and foliaceous lichens, *Evernia*, *Cetraria*, *Parmelia*, *Parmeliopsis* and *Xanthoria*. Altogether these seven finely produced volumes contain 664 pages of letterpress (in English) and 877 Plates (each of which is approximately $11\frac{1}{2} \times 9$ inches) with 3,634 figures, many of them coloured, of the whole plant or enlarged drawings of portions of the thallus and apothecia as seen under the microscope. The price of each volume is 40 Danish kroners, and the work is obtainable from Ejnar Munksgaard, Nörregade 6, Copenhagen, Denmark. In the volumes already published Cladoniales, Graphidales, Coniocarpales and Pyrenocarpales are not included but will probably be given in the volumes intended to complete the series.

The author does not consider the views of Stahl, Baur and Darbishire in regard to the fertilisation of an oogonium-filament (trichogyne) by a spermatium to be proved but believes that the process described by these authors as fertilisation has been wrongly interpreted.

Some attempt has been made to indicate the phylogeny of each genus. As may be expected such phylogenetic remarks are largely hypothetical and merely suggestive. For example in discussing *Lecidea* the author states that ' whether

the origin be mono- or poly-phyletic it is most probable that all species on pure mineral soil and on stone are of secondary origin and are derived from more primitive species on organic substrata seeing that Discomycetes unaccustomed to a lichen-symbiosis could hardly be expected to initiate a symbiosis on pure stone without first having gone through a process of adaptation on an organic substratum.'

In most lichenological works of the present time the colorations given by chemical solutions of potassium hydroxide, calcium hypochlorite and iodine are given a fair amount of importance in the determination of some species but in Galloe's work ' the reader will look in vain for any description of consistently carried out chemical investigations ' as in his opinion ' the chemical reactions have been considerably overestimated though the KOH reaction may doubtless often be a valuable help in a diagnosis.' Personally I should agree that the metabolic products which cause the chemical reagent to give a particular colour to the lichen-thallus may be variable in the same species and even in the same specimen but they are sufficiently trustworthy to be given in the diagnosis of a species. A solution of paraphenylenediamine is useful in distinguishing Cladonias. Harmand, in *Lichens de France* (1907), differentiated *Cladonia impexa* from *C. sylvatica* because the apical branches of the former were stretched out and divergent in a straight (or nearly so) manner whilst in the latter they were distinctly pendulous. *C. impexa* was given in my ' New, rare or critical lichens ' (*Journ. Bot.*, 1917) as ' frequent on the Somerset hills ' and also from other counties. It sometimes occurs with *C. sylvatica* and occasionally makes some approach to it but their differentiation has, in recent years, been emphasised by the use of paraphenylenediamine (usually signified by P or Pd) which gives a reddish colour to *C. sylvatica* but is negative to *C. impexa*. Pd is similarly useful in specimens which may be placed in *C. ochrochlora* or in *C. glauca* as the coloration is only given in the former. Galloe considers that the iodine and chlorine reactions are ' considerably overestimated.' Iodine solution gives a blue coloration to the medulla of the thallus in some species of *Lecidea* but I have examined specimens which seemed to be *L. cinerascens* in which the medullary coloration was absent or very faint. The calcium hypochlorite (C.) reaction is often indefinite in species which should give it but the lack of coloration is often due to the poorness of the reagent. It is advisable to keep some *Parmelia fuliginosa*, or some other reacting lichen, handy for testing its efficiency, or to use some strong solution of bleaching powder instead of the C. solution recommended in Crombie's or A. L. Smith's Monographs.

For species of *Lecidea*, Galloe follows the nomenclature used by Theodore Fries in his *Lichenographia Scandinavia* and also attaches much importance to his nomenclature in regard to other genera. He does not give a list of synonyms, and, in many instances, gives the authority for the binomial name of the plant to the author of the specific name even when the species was not placed in the genus used by Galloe. For example, ' *Rhizocarpon calcareum* Weis ' was described as *Lichen calcarius* by Weis in 1770. It was not until 1860 that it was placed under the genus *Rhizocarpon* by Th. Fries and the combination should be attributed to him. If the contribution to the name made by Weis is to be acknowledged the name of the plant may be given as *Rhizocarpon calcareum* (Weis) Th. Fr. For these reasons the beautiful illustrations and careful descriptions of the *Natural History* can be made of greater service to a British lichenologist if the names used by Galloe can be referred to those used by A. L. Smith, though it does not necessarily follow that her names are always preferable to them.

In the following list there is an alphabetical arrangement of the specific names used by A. L. Smith where there is any difference from the names used by Galloe. The names used in his *Natural History* are given in brackets.
Lecanora achariana (*Placodium cartilagineum*). *Lecanora symmictera* var. *aitema* (*L. trabalis*). *Rhizocarpon alboatrum* (*Diplotomma a.*). *Bacidia atrogrisea* (*B. endoleuca*). *Buellia canescens* (*Catillaria c.*). *Gyalecta carneola* (*Pachyphiale c.*) *Rhizocarpon confervoides* (*R. reductum* and *R. grande*). *Pannaria rubiginosa* var. *conoplea* (*P. coeruleobadia*). *Buellia colludens* (*Catocarpon applanatum*). *Gyalecta diluta* (*Microphiale d.*). *Parmelia exasperata* (*P. aspidota*). *Rinodina exigua* (*R. e.* and *R. pyrina*). *Lecidea expansa* (*L. erratica*). *Lecanora farinaria* (*L. conizaea*). *Leptogium fragrans* (*L. microphyllum*). *Biatorina griffithii* (*Catillaria tricolor*). *Lecidea griseoatra* (*L. tenebricosa*). *Lecania illecebrosa* (*L. amylacea*). *Biatorina intermixta* (*Catillaria laureri*). *Leptogium lacerum* (*L. lichenoides*).

Lobaria laciniata (*L. amplissima*). *Bilimbia lignaria* (*B. milliaria*). *Xanthoria lychnea* (*X. candelaria*). *Parmelia multifida* (*P. incurva*). *Lecanora muralis* (*Placodium saxicola* as given). *Nephromium* (*Nephroma*). *Lecidea parasema* (*L. elaeochroma* pro parte). *Platygrapha periclea* (*Schismatomma abietinum*). *Parmelia perlia perlata* (*P. trichotera*). *Bacidia phacodes* (*B. albescens*). *Biatorina premnea* (*Catinaria grossa*). *Lecania prosechoides* (*Lecanora p.*). *L. prosechoidiza* (*Lecanora prosechoidiza*). *Euopsis pulvinata* (*Thyrea p.*). *Platygrapha rimata* (*Schismatomma r.*). *Placodium rupestre* (*Lecidea rupestris*). *Synechoblastus rupestris* (*Collema rupestre*). *Bilimbia sabuletorum* (*B. hypnophila*). *Lecanora subimbricata* (*Placodium circinatum*). *Lecidea tenebricosa* (*L. erythrophaea*). *Bilimbia subviridescens* var. *trisepta* (*B. ternaria*).

List of British works containing descriptions or keys for the determination of lichens.

Crombie, J. M., Monograph of Lichens found in Britain, Part 1. British Museum, 1892.

Leighton, W. A., The Lichen-Flora of Great Britain, Ireland and the Channel Islands, 3rd edition, 1879.

Mudd, W., Manual of British Lichens, 1861.

Smith, A. L., A Monograph of the British Lichens, Part 1 (1918). Part II, edition 1 (1911); edition 2 (1926).

Watson, W., The Determination of Lichens in the Field. *Journal of Botany*, 1922, as a supplement and later as a reprint.

AN OCCURRENCE OF LEISLER'S BAT IN ESSEX

KENNETH F. BURTSAL

On the evening of the 21st June, 1949, I obtained an example of Leisler's Bat, *Nyctalus leisleri* Kuhl., at Wendens Ambo near Saffron Walden in Essex. The specimen which is now in the collection of Mr. David L. Harrison, F.Z.S., was seen in the company of another bat which was almost certainly another Leisler's bat. Both bats appeared together late in the evening flying at a constant height of approximately 30 to 40 feet. The flight was less erratic than that of a Noctule and both bats appeared considerably smaller and lighter on the wing, the wing beat being noticeably quicker and more shallow.

This record shows that there is a great deal more to be known about this species before a true picture of its distribution in these islands can be obtained. It is known to be fairly well distributed in North and East Ireland but on the mainland only eleven definite records have been made, and many of these date from the last century. It has been found in the North and West Riding of Yorkshire (Barrett-Hamilton, 1910), in Cheshire (*loc. cit.*), in the Valley of the Warwickshire Avon (*loc. cit.*), at Hindhead in Surrey (Vesey-Fitzgerald, 1949), and more recently by Vesey-Fitzgerald (1944) in the Meon Valley in Hampshire.

In May, 1946, Mr. Harrison obtained a pregnant adult from Hildersham in Cambridgeshire (*Nat.*, 1946, 147-148), which is a little more than ten miles from Wendens Ambo, thus extending the known distribution far to the east. It might have been that this was merely a chance occurrence of this rare bat right on the fringe of its distribution but this later record suggests that this species, though undoubtedly rare in these islands is more than a mere straggler to the eastern counties. An early record from Norfolk (Paine, 1838) was considered very doubtful by Barrett-Hamilton but it may well be that this bat will be found at other places in East Anglia or even anywhere in the Midlands or Southern England where the countryside is suitable for it.

Another point of interest is the tendency of this bat to wander. This was stated by Lydekker as far back as 1893. I have been observing the bats in this area almost continuously for the past three years since it is my home and I have only very rarely seen a bat which I had suspected of being a Leisler's bat. There are one or two pairs of Noctules to be seen most evenings from mid-April to early October but when towards the end of June the cockchafers come out the Noctules seem to congregate suddenly from nowhere. I have counted as many as thirty. On the evening when the Leisler's bat was obtained I counted nine Noctules in the area. It was not until some time after the Noctules had disappeared that the Leisler's bats put in their appearance.

On the whole although the countryside is a typical habitat for the Noctule, it is not what one would describe as ideal for Leisler's bat. However, a few miles away to the north and to the south there are several large areas of parkland which are well suited to this species notably Debden Park and the grounds of the well-known Audley End Mansion. It is, therefore, quite possible that these bats are resident in this area but wander considerably from time to time probably keeping mostly to the wooded pasture land along the upper reaches of the Cam or Granta. In this connection it is interesting to note that during the three years 1946 to 1948 Mr. Harrison made frequent visits to Hildersham and apart from the occasion in May, 1947, when he obtained his specimen, on no other occasion did he see any bat which resembled a Leisler's bat although, on every occasion there were Noctules present.

Finally, owing to the difficulty in identifying this bat from the Noctule, I will set forth the flesh and skull measurements. These compare very closely with previous known measurements particularly with those of Mr. Harrison's female. The specimen was an adult female with proliferated mammery glands and there can be no doubt whatever that the specimen was full grown. It had also the darker colouring typical of the species. The fur was dark at the base but lighter at the tips. The usual band of hair under the wing was also present.

The measurements were made by Mr. Harrison himself and I am indebted to him for his trouble.

FLESH MEASUREMENTS IN MILLIMETRES

Length	105·5	Forearm	42·2
Tail	40·2	Ear	14·8
Hind Foot	9·2	Wing Span	300

SKULL MEASUREMENTS IN MILLIMETRES

Condylosobasal Length	15·5	Lachrymal Breadth	6·8
Zygomatic Breadth	10·4	Maxilliary Tooth Row	5·7
Interorbital Constriction	4·9	Mandibular Tooth Row	6·1
Breadth of Brain Case	8·5	Candylomandibular Length	11·3
Depth of Brain Case	(Approx.) 5·6		

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3. Vesey-Fitzgerald, B. (1944). The Distribution of Bats in Hampshire. *Proc. Hants. Field Club and Archael. Soc.* Vol. XVI, Pt. 1.
4. Harrison, David L. (1946). An Extension of the Distribution of Leisler's Bat in Great Britain. *Nat.*, 147-8.
5. Paine, T. (1838). *Ann. and Mag. Nat. Hist.*, 181-183.
6. Lydekker (1893). *Royal Nat. Hist.* 1, 277.

In Memoriam

CLIFFORD BROWN, B.Sc.
(1909—1949)

THE news of Mr. Clifford Brown's unexpected death on October 11th at the early age of forty, came as a severe shock to the members of the Bradford Naturalists' Society and to his naturalist friends in Scarborough and Hull.

A science master by profession, he specialised in the study of lepidoptera. He joined the Bradford Society in 1939, and his lecture on the British hawk moths was to have been the last in the Society's present winter programme.

Mr. Brown was born at Wakefield, and received his early education at Thornes House Grammar School, later taking his B.Sc. at Leeds University. He had a varied teaching experience, holding appointments at Haversham School, Milnthorpe ; King Edward VI School, Nuneaton ; the Grammar School, Hull ; Scarborough College ; and finally, Carlton Boys' High School, Bradford.

Quiet and unobtrusive in manner, he gave one an impression of great steadiness and reliability. All who knew him will mourn the loss of a good man, and will extend to his widow and young son the greatest sympathy.—S.J.

THE YORKSHIRE NATURALISTS' UNION EIGHTY-EIGHTH ANNUAL REPORT

(Presented at Keighley on Saturday, December 3rd, 1949)

The Eighty-seventh Annual Meeting was held in the Lecture Room of the Public Library at Scarborough on Saturday, December 4th, 1948, on the invitation of the Scarborough Field Naturalists' Society. The Annual Report for 1948 was presented there and is printed in *The Naturalist*, 1949, 19-40.

The Presidential Address, ' Bird Observatories and Migration,' was given by the President, Mr. W. B. Alexander, M.A., M.B.O.U. This is printed in *The Naturalist*, 1949, 1-8.

The Presidency for 1950 has been offered to and accepted by Arthur Raistrick, M.Sc., Ph.D., F.G.S., Lecturer in Geology, Kings College, Newcastle-on-Tyne.

The Excursions for 1950 will be held at :

V.C. 61. Driffield, July 8th.
V.C. 62. Malton, May 27th to 29th.
V.C. 63. Sheffield for Bradfield, July 29th.
V.C. 64. Hetton and Winterburn, June 24th.
V.C. 65. Ripon-Tanfield, June 10th.

New Members :

M. A. Barras-Smith, 6 Talbot Crescent, Leeds 8.
Miss Sheila Barras-Smith, 6 Talbot Crescent, Leeds 8.
Lt.-Col. R. S. P. Bates, Wheatley Old Hall, Ben Rhydding.
G. V. Baxter, 2 St. Peters Street, Huddersfield.
Miss F. M. Brown, B.Sc., 71 Northgate, Rivers Board, Wakefield.
D. B. Byles, B.Sc., Austwick, Lancaster.
A. C. Collinge, 2 Wood View, Savile Park, Halifax.
E. A. Croft, School House, Wressle, Selby.
G. B. Davidson and Mrs., 61 Spencer Place, Leeds 7.
G. Fryer, 83 Brittania Road, Milnsbridge, Huddersfield.
R. H. Hall, 2 Hartington Terrace, West Road, Buxton.
H. Henson, Ph.D., D.Sc., F.R.E.S., 39 Jackson Avenue, Leeds 8.
Miss M. Higgs, 18 Raynville Road, Leeds 12.
C. W. Hunt, B.Sc., Museum and Art Gallery, New Walk, Leicester.
S. M. Jackson, 15 Westbourne Road, Selby.
M. Johnson, Birch Hall Camp, Langdale End, Scarborough.
L. Jones, F.R.E.S., 76 Gillshill Road, Hull.
F. Kennington, Lodge Farm, Benningholme Lane, Skirlaugh, E. Yorks.
Miss S. H. Knowles, Ringinglow, Harrogate Road, Ripon.
H. Marjoram, Riffa House Farm, Pool.
R. I. Maugham, Estate Office, Jervaulx, Ripon.
Miss N. Maugham, Abbey House, Jervaulx, Ripon.
A. S. McAllister, Brigham Grove, Preston Road, Hull.
L. F. H. Merton, B.A., Botany Dept., Leeds University.
H. L. Morgan, 6 Hilltop Road, Leeds 12.
H. Pease, 19 Southdene Terrace, Filey.
Mrs. M. Prosser, 11 Ripon Road, Harrogate.
Mrs. E. Robinson, B.Sc., Botany Dept , Leeds University.
R. M. W. Shaw, Kinnesburn, Carlton Grange, Batley.
N. Smedley, M.A., Art Gallery and Museum, Doncaster.
B. H. Smith, 2 Colwyn Road, Leeds 11.
Group-Capt. R. Smith-Pigott, D.S.O., Blue Bell Cottage, Kilnsea, nr. Hull.
Miss E. Unné, 30 Swan Road, Harrogate.
D. Walker, Sub-Dep. Quaternary Resc., Botany School, Cambridge.
C. Webb, Townend Cottages, Staveley, Harrogate.
G. I. Wells, 4 Hyde Park Road, Harrogate.

The following have ceased membership :

Sir W. de L. Aitchison, of Wooler.
V. Allan, of Harrogate.
Miss H. E. Allison, of Bingley.
Mrs. Astley Cooper, of Surrey.
J. A. Baldwin, of Harrogate.
Rev. J. E. Beckerlegge, of Penzance.
A. B. Brown, D.Sc., of Huddersfield.
Miss C. H. Browne, of Harrogate.
B. Burstall, of Hull.
Major F. G. Caldwell, of Ripon.
Miss Joan East, of Bingley.
J. H. Elliot, of York.
Mrs. G. B. Foster, Kirbymoorside.
C. E. Goodwin, of Garforth.
G. C. Howe, of Kingswood.
L. G. Knight, of Farnley Park, Leeds.
Rev. O. J. Lambert, of Ampleforth.
Miss E. M. Lind, of Manchester.
E. W. Lomas, of Dorking.
M. F. M. Meiklejohn, of Glasgow.
J. A. Moffat, of York.
D. Picken, of Leeds.
H. Pickles, of Doncaster.
J. A. Rodgers, of Pannal.
R. V. Roger, of Pickering.
G. W. Roome, of Sheffield.
R. Wagstaffe, of York.
Mrs. P. Yeoman, of Brompton.

Deaths :

Clifford Brown, B.Sc., of Baildon.
T. Petch, B.A., B.Sc., of North Wooton.
R. Procter, of Leeds.
Mrs. A. M. Roddis, of Haworth.
T. E. Spence, of Ripon.
W. Thurgood, of Leeds.
A. Wilson, F.L.S., of Priest Hutton.

Changes of Address :

F. R. Allison to Eller Close Gardens, North Lane, Leeds 8.
R. Bramhill to Town Clerk's Office, Rotherham.
B. Bussey to The Laurels, Belaugh, Wroxham.
J. R. Dibb to The Cottage, 30 Plantation Road, Wollaton, Notts.
C. E. Fisher, 10 Hancock Museum, Barras Bridge, Newcastle-on-Tyne.
F. C. Griffith to 14 Brompton Road, Sprotborough, Doncaster.
D. R. Hughes to 41 Main Avenue, York.
R. P. Libbey to 143 Gaywood Road, Kings Lynn.
J. Lord to 369 Chestis Road, Boldmore, Sutton Coldfield.
S. Marriage to High Beeches, Roods Lane, Holmbridge, Huddersfield.
Miss Parkinson to School House, Collingham, Yorks.
J. H. Murgatroyd to 'Arachne,' 9 Warren Edge Road, Southbourne, Bournemouth.
W. O. Steel to " Ken," Braywoodside, Maidenhead, Berks.

FRESHWATER BIOLOGY

(H. Whitehead).—The year has been a very successful one. The excursions to Worsborough Reservoir (May 21st) and to the Harrogate District at Whitsuntide (June 4th to 6th) took place before the effects of the drought began to be felt. Reports of these excursions have already appeared in *The Naturalist*, 1949 ; 161-163.

The following three reports have been received from members of the Freshwater Biology Committee :—

Austwick (Chris. A. Cheetham).—The amount of stoneflies, mayflies and caddisflies in the crevices of the walls at the Pant and Flascoe gave me the notion of collecting these and other fishermen's flies through the season.

May 2nd and for some weeks, *Protonemura meyeri* (Pict.) very plentiful. Around May 13th, *Isoperla grammatica* (Poda) and *Chloroperla torrentium* (Pict.) plentiful and continued through June and July. During May I had *Ecdyonurus venosus* (Fabr.), *Paraleptophlebia submarginata* (Steph.), *Caenis rivulorum* Etn., *Rhithrogena semicolorata* (Curt.), *Baetis pumulis* (Burm.). At this time *Sialis lutaria* L. began to be fairly plentiful, at the end of the month *Leptophlebia vespertina* was generally about.

June 1st was the time of the big hatch of *Ephemera danica* Müll. and about this time Mr. Byles brought me ♂, ♀ and nymph of *Perla cephalotes* Curt. from Keckersgill.

June 13th and the following two weeks, *Sericostoma personatum* Spence was abundant.

June 17th I began to get *Odontocerum albicorne* Scop. and this is still about (September 6) at Austwick Bridge. I had *Heptagenia lateralis* (Curt.) and an odd *Rhyacophila dorsalis* Curt. at the Sheepdub, June 20th.

June 22, a cloud of *Ephemerella ignita* (Poda) were depositing egg clusters on the road at the Traddock.

July 1st brought *Paraleptophlebia cincta* (Retz.) and *Habrophlebia fusca* (Curt.) in plenty for a week or two and *Mystacides azurea* L. appeared and is still with us (September 6th).

July 17th, *Ecdyonurus torrentis* Kimm. and on 21st the small *Psychomyia pusilla* F. was in clouds on the vegetation with a few *Tinodes waeneri* L.

The first fortnight in August was damp. August 14th, *Centroptilum luteolum* (Müll.) plentiful, 8 p.m., and onwards, also a few *Ephemerella ignita, Psychomyia pusilla, Odontocerum albicorne* and *Mystacides azurea.*

August 17th, *Limnophilus lunatus* Curt. at Harden Bridge and a lot of *Leuctra fusciventris* Steph.

August 20th at Sheepdub, *Rhyacophila dorsalis* Curt., and on to September 6th. *R. munda* McLach., a few *Anabolia nervosa* Curt. at Austwick Bridge.

August 31st, *Rhyacophila dorsalis* at Austwick Bridge. From Harden Bridge, *Ephemerella ignita, Baetis pumilus* and *B. rhodani* (Pict.), *Leuctra fusciventris, Tinodes waeneri* and *T. dives* Pict. From the Sheepdub, *L. fusciventris, Nemoura cambrica* Steph., *Nemurella inconspicua* (Pict.), *Tinodes dives* and *T. waeneri.*

September 14th, *Anabolia nervosa* Curt., *Rhyacophila dorsalis* Curt., *R. munda* McLach.

October 5th, *Chaetopteryx villosa* Fab., *Halesus auricollis* Pict., *H. guttatipennis* McLach.

Dewsbury (E. Thompson).—In this area the season has proved much more prolific than that of 1948. Streams have kept a good level throughout the drought and our ponds and dams have never been completely dry. Winged aquatic insects have been numerous and new local records have been made.

Coxley Dam is still of considerable size, though masses of *Epilobium hirsutum, Hippuris vulgaris,* and other plants are yearly encroaching on it. One notable feature has been the large number of caddis larvae of the genus *Molanna.*

Howroyd Beck in the adjoining valley gave a good rise of *Ecdyonurus venosus* (Fabr.). It is of interest to note that this species does not appear to be in the Coxley stream although the streams are similar in general character and only two miles apart. It is hoped to investigate this problem.

Batley Park Lake had an astonishing number of the Horse Leech (*Haemopis sanguisuga* Linn.). These leeches are common inhabitants of the lake but this year their numbers were so great that people not usually interested in natural history commented on the fact.

It is regretted that access to two dams at Batley has not been possible. It is hoped to obtain permission to visit them next season. These are Bullrush Dam, now much overgrown, and Needler's Dam, a fair sized stretch of water in open country between Batley and Morley.

Though a little out of our area the stream at Judy Woods, near Wyke, has been visited regularly throughout the year. The stream flows through thick woodland and abounds in mayflies, caddisflies, stoneflies and aquatic Diptera. Molluscs, two species of leech, many aquatic annelids and the freshwater shrimp are found here.

Rather late in the year I was taken to a stream new to me. It rises near Mirfield Parish Church and flows for about a mile through meadowland before entering a built-up area. The banks are covered with herbage, the water is clear and stones on the stream bed are crowded with caddis cases of *Agapetus.*

Miss F. M. Brown, B.Sc., has contributed the following, which is published by permission of Mr. J. H. Garner, Chief Inspector, West Riding of Yorkshire Rivers Board.

Upper Lake, Roundhay Park, Leeds.—Samples of water taken during the hot weather in July of this year were analysed and found to be similar to those taken during similar weather in 1948, when large numbers of fish were killed during the nights of July 30th and 31st. (*Naturalist,* 1949 : 21.)

Conditions on July 4th this year were evidently similar to, though slightly less pronounced, than those in July, 1948.

Microscopical examination showed the presence of the same small Chlorophyceae and Cyanophyceae. There are no filamentous algae or larger plants in the lake. This is probably due to the shallowness and artificial conditions.

Although the temperature of the water in the lake was slightly higher than on the previous occasion, the light intensity was probably less, and the photosynthetic activity of the algae correspondingly less pronounced.

The table below shows comparative data for samples taken in 1948 and 1949 :—

Date	4/7/49	5/8/48
Time	4-0 p.m.	6-0 p.m.
*Oxygen in solution	1-05	1-31
Temperature	73°F.	65°F.
Percentage saturation	121	138
*Total alkalinity in terms of $CaCO_3$ ...	9-0	11-5
*Caustic alkalinity in terms of CaO ...	0-85	1-5
pH value (electrometric)	9-35	9-50

* Parts per 100,000.

Oscillatoria.—In many streams, growth of the blue green alga *Oscillatoria* was apparently encouraged by the warm spell of weather in April and May. Samples and reports received during the period April 13th—May 13th showed exceptionally heavy growths which appeared suddenly.

In two dams, one at Saddleworth and one at Sutton (Keighley), sudden rapid growths of *Oscillatoria* rose to the surface together with entangled silt and debris from the bottom, forming a thick scum. At Sutton this probably caused the death of numerous stone loach.

Another mill dam at Airton showed an unusually heavy growth of *Oscillatoria* which formed thick masses of brownish green scum at the surface, early in May. Anglers who have visited this dam regularly have not seen such a growth in other years.

Similar sudden heavy growths occurred at the fish hatchery at Keld Head, and probably contributed to adverse conditions experienced by the young trout during April.

Phenological Committee (W. E. L. Wattam) : As stated in my report for 1948, a form of Recording Return based upon the system used by the Royal Meteorological Society was distributed to the members of the Committee and others thought to be interested in Phenological compilation, but the forms returned are few in number. The contributors are for V.C. 61 (S.E. Yorks.) Mr. R. Lewis and Mr. G. Ainsworth ; V.C. 62 (N.E. Yorks.) Miss C. M. Rob (Catton area) ; V.C. 63 (S.W. Yorks.) Mr. A. Malins Smith (Shipley District), Bradford N.H. and Microscopical Society per Mr. F. Hewson (Birds and Insects only), and my own for the Huddersfield District ; V.C. 64 (Yorks. Mid-West) Mr. A. Thompson (Skipton District) and the Wharfedale Naturalists' Society per Miss E. M. Brown (Ilkley District).

As regards the listed flowering plants, the earliest date for Hazel was January 12th at Catton ; for Coltsfoot, January 23rd, at Withernsea, but elsewhere from February 10th to the 25th ; Wild Hyacinth at Bradford on April 9th, all other areas April 15th to 20th. The flowering of the Dog Rose (*Rosa canina*) was from June 6th to the 26th ; Foxglove, June 4th to 12th ; Ling, July 10th at Ilkley, and in full perfection at Huddersfield, September 28th. In his remarks upon unlisted species, Mr. R. Lewis states that a plant of *Epipactis helleborine* (L.) Crantz. was in blossom at Winestead on October 31st, and *Orchis mascula* on May 23rd, at Hornsea, an unusually late date.

As regards the selected trees, most flowering records were in the latter part of April (23rd to 30th). Ash, mid-April and Horse Chestnut, late April and early May.

Reports received on the wild fruit crops of the thirteen selected trees all agree that the Ash fruit crop was most prolific. The Returns give the Beech crop as poor : by verbal statements at the Sectional meeting it was said to be abundant at Church Fenton and Bolton Percy. The records for Oak (*Q. robur*) were agreed that the crop was below average ; a great deal of undeveloped fruit was in evidence but apparently the dryness had prevented full maturity. The same remarks apply to the Sycamore. Hawthorn has produced an excellent crop in the Huddersfield District, but elsewhere only medium crops are reported. The Horse Chestnut

crop is considered as excellent in all the four vice counties. The fruit yield on the Mountain Ash trees occurring in the woodlands towards the edge of the millstone grit areas in the South-West Pennines are poorly developed owing to the drought. The Elder has furnished a splendid crop, ready for gathering in the early part of August. The Hazel has produced good crops in V.C. 62 and 64, but in the remaining vice counties the crops are poor, and this despite the fact that weather conditions were favourable at the time of flowering. The fruiting of the Alder has been excellent. For some reason the fruit crop of the Wild Crab Apple is nil, although the trees gave a gorgeous display of blossom.

As regards the fruit crops of the plants of shrubby growth, and upon which no records are asked for on the Phenological Return, the Bramble crop has been phenomenal, and what is more, the fruits have ripened splendidly despite the prevalent dryness. In comparison the Dewberry has suffered greatly from the drought conditions, the fruits being only partially developed. The Bilberry crop in the Huddersfield District has been poor, the half-developed fruits being hard. Where a moist soil was available the Wild Raspberry cropped quickly and well. Black Crowberry has furnished a good fruit crop. The fruits of the Cloudberry have been poor in Chew Valley, but a moderate crop developed on the Langsett Moors within the Yorkshire Mersey Drainage Area.

1949 will long be remembered for its extreme dryness following a mild winter and normal spring. The summer period was marked by prolonged periods of high temperatures, and new sunshine records were constantly recorded. Lack of rainfall brought at least two periods of official drought. It is remarkable how plant life adapted itself to the changed conditions, inasmuch as the only rainfall since mid-June to end of September was that which accompanied electrical storms, and whilst vegetation was outwardly refreshed yet ground soakage was of little depth.

The Committee are wishful for the recording they desire to become more stabilised, and desire to urge the necessity for everyone who receives the form of Return to fill in such information as can be supplied. Notes upon the prevalent meteorological conditions should be furnished whenever possible. Such notes can be written on the blank portions of the form of Return.

MAMMALS, REPTILES, AMPHIBIANS AND FISHES COMMITTEE

The mild and open winter together with the wonderful summer which succeeded it have been favourable not only to the increase of creatures ' great and small ' but also to their observation and the year's report is accordingly more than usually full and interesting. Fish records alone are somewhat sparse since the close watch kept on the Scarborough landings by the late W. J. Clarke has not yet been taken up by another member.

Mammals (Mrs. A. Hazelwood) : CHIROPTERA.—Records of Bats continue to be disappointingly few. Considering the work done in the Barnsley Area in the early part of the century and sustained at Helmsley by Mr. Adam Gordon the rest of the county merits close attention. By enlisting the aid of slaters and other property repairers, members could do much to increase our knowledge of the distribution of this least-known order of mammals. The Barbastelle is again reported for Helmsley and Noctules have been seen at York by Mr. Wilfred Taylor while Pipistrelles are recorded at Newsome, near Huddersfield, by Mr. Wattam.

INSECTIVORA.—Hedgehogs are reported to have been more numerous than usual in many localities from Spurn to Helmsley and Mr. Butterfield continues to see a large number of dead on the roads near to Keighley.

Mr. F. Dean sends an interesting note of a Water Shrew feeding ' along the surface of the water like a duckling ' on a pond at Hebden Bridge during three successive calm summer evenings. He surmises that it was reaping the harvest of a ' hatch ' of aquatic insects.

Mr. G. H. Ainsworth reports the Common Shrew as being especially abundant at Spurn. Mr. Dean also considers the species as more numerous near Hebden Bridge and mentions a nest under horse droppings at an altitude of 900 ft.

A white Mole was caught near Hebden Bridge on February 23rd.

RODENTIA.—Both the Red and the Grey Squirrels seem to be on the increase, the former being reported from several localities near Huddersfield, from the Spurn Area, near Wassand, Stapleton Park, Hebden Bridge and Hardcastle Crags while the alien animal has been seen at Glusburn, Huddersfield and Masham.

They are said to be on the increase in the last locality after a set-back, while Mr. Ainsworth believes that tree-felling has led to some reduction in their numbers near Hull. One seen near Huddersfield was 'dive-bombed' by a jackdaw. A Grey Squirrel was seen in Peel Street, Huddersfield, at 8-10 a.m. on May 13th.

Rabbits appear to be approaching their pre-war numbers again in some localities and Hares are fairly plentiful. A number of young black Rabbits are reported this season from Hebden Bridge.

The Short-tailed Field Vole would seem to have had a peak year which may be reflected in the number of Short-eared Owls reported by the ornithologists, from many districts.

A Water Vole is reported from an altitude of 1,500 feet on White Moss, above Wessenden.

CARNIVORA.—The number of Foxes reported is conspicuously smaller this year. It may be that the increase in the number of Rabbits has permitted a wider distribution away from the towns where they are more often seen and more ruthlessly hunted down.

Otters are reported from Parlington Park, Holderness and Appletreewick, Malham Tarn and Hornsea Mere.

A White Stoat was seen near Glusburn on January 16th, although gamekeepers report that there was very little tendency last winter for Stoats to assume a white coat. One Stoat was seen to carry a very large rat to a hole which had to be entered over a board about one foot high ; the rat appeared heavier than the Stoat which had little difficulty in negotiating the obstacle.

An unconfirmed report says that a Weasel was seen dragging a frog across a lane at Thornton Dale in September.

Reptilia (Mrs. A. Hazelwood) : The most interesting note of the year is the reported occurrence of the Sand Lizard at Spurn, examples which are referred to this species having been taken by Mr. C. E. A. Burnham, Mr. L. Jones and by Miss Phyllis Bond of the Haslemere Museum.

The Viviparous Lizard is reported to have become very common on the moors north of Helmsley and Glusburn.

Slow-worms are to be found in the earthworks of Helmsley Castle and during the year several have been picked up in the village streets.

The Grass Snake is reported from a new locality—Hepton, near Hebden Bridge, and a large example, 42½ ins. long was seen at Spurn by Mr. Ainsworth.

Amphibia (Mrs. A. Hazelwood) : Frog-spawn was first noticed at Newsome on February 22nd and tadpoles on April 1st. Dr. Spaul tells me that he was fortunate enough to observe an occurrence of the frenzied spontaneous spawnings which sometimes take place when unusually favourable conditions suddenly beset the animals and so telescope the normal behaviour pattern as to result in 'a mass of animals clutching one another. There was a ball of anything from a dozen to twenty . . . and it was possible to lift them out of the water as a complete mass. In addition to these balls of Frogs there were others swimming round among the grass in this shallow pond croaking and trying to find a mate or the mass, so that they could join it.' This episode took place at Robin Hood's Bay on March 24th, a warm, sunny, day in two small ponds which now exist on top of the fallen boulder clay cliff.

No Palmated Newts are reported for the year but the two commoner species are noted from many places.

Pisces (Mrs. A. Hazelwood) : Mr. Chas. Procter reports Barbel as being numerous and big in the tributaries of the Ouse.

The Annual Report of the Yorkshire Fisheries Board indicates a healthy state of affairs in non-industrial rivers and a close watch on pollution, and it is to be hoped that it will not be too long before all our rivers hold fish again, though the economic crisis will no doubt provide a ready excuse for the failure to provide anti-pollution measures in industrial regions. There is a report of fish being poisoned in Cock Beck in August.

Marine records are sparse, though the Tunny has been much in the news and a fish of 852 lbs. was the largest yet landed at Scarborough.

A Shark was washed ashore at Ulrome near Bridlington on December 22nd, 1948. It was 15 feet long and weighed about one ton.

Mr. Rex Procter said that in February, 1,000 8-10-inch Rainbow Trout were

added to a stream where a mass spawning of Toads took place. Four months later he caught a 13-inch fish, showing a rapid rate of growth on tadpole-feeding.

ORNITHOLOGY

Interim Report (R. Chislett) : Mr. W. B. Alexander's Presidential Address on ' Bird Observatories and Migration ' was published in the January-March issue of *The Naturalist.*

The Annual Report for 1948, after circulation to contributors for correction of details, was published in *The Naturalist,* and reprinted in pamphlet form.

At the March meeting, Col. R. S. P. Bates showed a large collection of slides of Indian birds, and W. R. Grist presented recordings of bird songs and notes by the Swedish Broadcasting Corporation. Both were highly appreciated, as were the commentaries of both gentlemen.

The finest spring and summer for many years provided a successful breeding season for most species, enabling such depleted species as Wren and Goldcrest to restore their numbers. The recovery of the Heron is somewhat slower, since this bird does not breed in its first year. Shrinkage of waters, particularly reservoirs, has caused difficulties for Grebes, many of whose nests became stranded.

Little Ringed Plovers have again nested in the county. Several nests and broods of Woodlarks have been noted. A Honey Buzzard has been picked up dead.

The Spurn Observatory is having a successful year. 82 birds were recently ringed in one day. Our ringing year ends on October 31st and the total ringed in the current year on October 15th already exceeded 1,500—or approximately double the figure of last year. Among the unusual species caught have been Barred Warbler, Greenish Warbler, Yellow-browed Warbler, Red-breasted Flycatcher, Siskin, two Wrynecks and a Merlin. A Willow Warbler captured in early October proved to have been already ringed as a nestling this year in Sweden. A Sparrow-hawk ringed in August, 1947, was recaptured in September, 1949.

A meeting of regional representatives of the British Trust for Ornithology was held at Bridlington on September 24th, and was attended and addressed by Messrs. Ainsworth, Ellis, Garnett and Chislett. In the evening, by invitation, R. Chislett spoke on the work of the Y.N.U., followed by a talk with slides on Yorkshire birds. On the Sunday the whole party travelled to Spurn by special bus, to inspect our Observatory, escorted by G.H.A., R.M.G. and R.C. The B.T.O. Chairman (Mr. E. M. Nicholson) and the Secretary (Dr. Bruce Campbell) have expressed appreciation of their reception in Yorkshire and pleasure with all they saw.

The detailed Annual Report will be considered at the meeting due for March 11th. It is requested that notes be sent in early, without which it would be impossible to have the manuscript in the printer's hands in time for proofs to be circulated before the meeting.

CONCHOLOGY

(Mrs. E. M. Morehouse).—The summer has been a very dry one for both the land and freshwater mollusca, many ponds and drains having entirely dried up.

Mr. C. F. Sweetman has sent a good list of molluscs, collected by him and Mr. A. Smith at Gun Dale, Pickering. On May 14th, when the York Naturalists were there, he found several *Acanthinula aculeata* Müll and *A. lamellata* Jeff. on one piece of fallen wood.

The following species were taken :

Vitrina pellucida Müll.
Vitrea crystellina Müll.
V. cellaria Müll.
V. alliaria Müll.
V. nitidula Drap.
Euconulus fulvus Müll.
Pyramidula rotundata Müll.
Helicella itala L.
Hygromia hispida L.
H. rufescens Pen. (red and white forms).
Acanthinula aculeata Müll.
A. lamellata Jeff.
Arianta arbustorum L.
Hygromia nemoralis L. Very abundant and in great variety.
H. hortensis Müll. Very abundant and in great variety.
Ena obscura Müll.
Cochlicopa lubrica Müll.
Clausilia laminata Montagu. Very abundant.
C. bidentata Strom. Very abundant.
Carychium minimum Müll.

Mr. H. Whitehead has kindly forwarded three records of Mr. E. Thompson of Dewsbury :
Limnaea stagnalis L. and *L. auricularia* L. from Emroyd Common, Dewsbury, on August 26th, 1949. *Planorbis carinatus* Müll. from Coxley Dam, Dewsbury, on July 14th, 1949.

On June 18th, the Y.C.S. visited Spofforth Castle to confirm some old records. The following were seen :

L. maximus L.
Vitrea cellaria Müll.
Hygromia rufescens Pen.
Agriolimax agrestis L.
Pyramidula rotundata Drap.
Cochlicopa lubrica Müll.

On July 23rd, Mr. and Mrs. Fisher were at East Rigton on another Y.C.S. excursion, and there found *H. nemoralis* L. (type), var. *rubella* 00300 Moq-Tan. and *V. castanea* Moq-Tan., *H. hortensis* v. *lutea* 00000 Moq-Tan., *Vitrea cellaria* Müll., *P. rotundata* Müll., *Theba cantiana* Montagu, *H. rufescens* Pen.

On September 17th, under Dr. Lloyd's leadership, Knostrop Sewage Works were visited. The members went to the top filter beds ; they were shown the heaps of *L. pereger* Müll. and grit which had been removed from the egress as they blocked the flow to the final disposal. The *Limnaea* were small but abundant ; they appeared to reach maturity while only a quarter their proper size, judging by the quantity seen. To quote Mr. Fisher's remarks : ' I did a count on the heaps of dredged shells of *Limnaea pereger* Müll. In seven cubic inches I got a count of 677 specimens with five *L. truncatula* Müll., no land snail shells. So, since each heap was between one and two cubic feet, I calculate from 150 to 250 thousand in each heap, in the four heaps there must have been a million or so. The population in the filter beds must be terrific.'

Not one mollusc was, in the generally accepted way, full grown ; this may be due to not having the food to which they are accustomed in the dykes and ponds. One small slug was taken, *A. agrestis* L. This also was diminutive, it was living on the stones on the filter bed. Several of this species were seen, but all were very small.

The writer found three beautiful specimens of *H. nemoralis* v. *castanea* Moq-Tan. in a lane north of Malton. On the return journey a fortnight later a more prolonged search was made. It proved a rich locality. To the above were added the type *nemoralis* and many varieties including *V. olivacea* Risso., *V. rosea* Baudon., *V. rubella* Pic-., *V. libellula* Risso. and *V. gronovia* Moq-Tan., *Helicella virgata* da Costa and varieties, *Arianta arbustorum* L. and varieties. All the molluscs seen were in perfect condition.

ENTOMOLOGY

Lepidoptera (E. Dearing) : Records have been slow to arrive and, in consequence, this report is by no means comprehensive for the county. Reports from Miss Ackerley of Long Preston, W. E. L. Wattam of Huddersfield, F. Hewson for the Bradford Natural History and Microscopical Society, Ackworth School, C. A. Cheetham of Austwick, M. D. Barham of Leeds, and G. B. Walsh of Scarborough, have been consulted. It is evident that there is little work being done at the moment on the ' Micros.' since they do not figure in any of the notes submitted.

Some progress is being made with the revision of Porritt's List, but the response to the appeal for assistance has been rather disappointing.

The Lepidoptera Committee has lost by death the services of R. Procter, a past Chairman, and Herbert Spencer, an Associate and member of the South-west Yorkshire Entomological Society. The absences of these gentlemen will be noticed, for they were both ever eager to foster interest in beginners to the study of Lepidoptera in any means within their powers.

The meteorological conditions have been a mild winter followed by a more normal spring with an exceptionally warm and dry summer. Rainfall has been low during the period and from late June much of the rain has been associated with electrical disturbances.

The Clouded Yellow has made another of its appearances, though not so plentiful this year. The Whites were not so plentiful as had been expected by the favourable conditions. Mr. Wattam has seen three specimens of the Large Tortoiseshell in the Huddersfield area. The Holly Blue has been noted again at Elland, Ackworth,

Clapham and Esholt. Of other ' Butterflies ' all normal species have been seen and a specimen of the Ringlet with only one ocellated spot on the undersurface of the forewing, approaching var. *obsoleta* was taken at Holly Hall, Low Moor. This is a new record for the Bradford area. Type specimens of the Peppered Moth are now quite uncommon and a male was taken at Little Horton on June 12th. The Bordered Pug, also new to Bradford, was taken at Shipley on July 22nd by F. Hewson.

RECORDS

Xylophasia crenata (Hufn.) v. *nigro-rubidea* (63). Little Horton at light, 11/6/49 ; J. Briggs.

**Eupithecia succenturiata* (L.) (63). Gaisby, Shipley at light, 22/7/49 ; F. Hewson.

Erannis leucophaearia (Schff.) v. *marmorinaria* (63). Shipley Glen woods, 7 taken 12/2/49 when this species was abundant. One was unusually dark ; C. R. Haxby.

Phigalia pilosaria (Schff.) v. *monacharia* (63). Shipley Glen woods, several, 12/2/49.

Biston betularia (L.) (63). Little Horton, ♂ at light, type ; J. Briggs.

Gonodontis bidentata (Cl.) v. *nigra* (63). Little Horton, 23/5/49 ; J. Briggs.

Acherontia atropos (L.) (63). Girlington, Bradford, October, 1948 ; D. Kaye.

Celerio lineata (Fabr.) (63). Askwith, nr. Otley, larva 1/7, pupated 18/7, emerged 24/8/49 ; M. D. Barham.

**Aphantopus hyperantus* (L.) almost v. *obsoleta* (63). Great Park, Low Moor, 13/7/49 ; W. Barraclough.

Nymphalis polychloros (L.) (63). Lower Castle Hill, Huddersfield, one, 4/8/49, Newsome, two, 4/8/49, three, 15/10/49 ; W.E.L.W.

Polygonia c-album (L.) (62). One near Allerston, 3/9/49 ; M.D.B.

Aricia agestis (Schff.) (62). Gundale, Pickering, com., 18/7/49 ; M.D.B.

Colias croceus (Goeffr.) (62). Blansby Park, Pickering, ♂, 27/8 ; M.D.B. (63) Newsome, 4 ♂♂, 25/8, Hallbower, ♂, 26/8 ; W.E.L.W. : Washburn Valley, 5, 31/8, 3, 3/9, Greengates, 1, 25/8 ; Bradford Society.

Thymelicus sylvestris (Poda.) (63). Shipley Glen, 12/8/49 ; C. Brown.

**Augiades venata* (Bremer & Grey) (63). New Dam, Hawksworth, nr. Shipley, 1 ♂, 3/6/49 ; P. C. Quin.

Imagines of *Eupsilia transversa* (Hufn.) and *Conistra vaccinii* (L.) were sipping leaking sap from a wounded Birch trunk in Shipley Glen (63), 19/3/49 ; *E. transversa* was at sap from a Sycamore in Hirst wood (63).

Allophyes oxyacanthae (L.) v. *capucina* (Mill.) (63). Shipley Glen, 1, 18/9, Robert's Park, 5, Saltaire, 1, 1/10, Shipley Glen, 2 at sugar, 6/10/49 ; Bradford Society's notes.

Conistra vaccinii (L.) vs. *rufa* and *mixta* (64). Old Pool Bank, nr. Otley, at Ivy flowers, 8/10/49 ; Bradford Society's notes.

**Lithophane semibrunnea* (Haworth) (64). Old Pool Bank, 1 at Ivy flowers, 8/10/49 ; Bradford Society's notes.

**Platyptilia rhododactyla* (Schff.) (63). Little Horton at light, 14/9/49 ; Bradford Society's notes.

* New records to the Bradford List.

Nomenclature follows that of Kloet and Hincks (1945).

Diptera (Chris. A. Cheetham) : Diptera have not been abundant despite the hot season, possibly the hard dry ground and the baked peaty areas restricted the numbers of some species. On the dried-up marshes species like *Prionocera turcica* Fab., *Tipula melanoceros* Schum., *luteipennis* Mg. and *luna* Westh. were certainly in reduced numbers and *oleracea* L. and *paludosa* Mg. were not really plentiful in most of their habitats. Early in the year *T. vernalis* Mg. appeared to be quite up to normal and so were stream-side species like *lateralis* Mg., *variipennis* Mg. and *variicornis* Schum. The Hoverflies were also scarce though early in the season the large *Volucellas*, *bombylans* L. and *pellucens* L. did seem more plentiful than usual. At the Scotton Banks excursion the uncommon *Ctenophora pectinicornis* L. was more numerous than I have seen it previously and here Mr. J. Wood handed me an immature *Atherix ibis* F. At Austwick *Calobata adusta* Lw. was frequent for a short season and in early October it was strange to see large numbers of *Bibio lepidus* Lw. on the wing in many places and *B. pomonae* F. seemed to have a longer season than is usual.

Trichoptera (H. Whitehead) : Thanks to the good weather and to the efforts of other people a good list of Trichoptera has come to hand. The number of individual insects have been above normal. Lists of species taken during the excursions to Worsborough and to the Harrogate District have been printed in *The Naturalist*, 1949, pp. 163, 167-8. *Agrypnia pagetana* Curt. is noteworthy as being new to Yorkshire.

Mr. Cheetham has directed his attention to the Caddisflies of Austwick where they have appeared in considerable numbers. He has taken eleven species and a list of these with notes on times of appearance is given in the report of the Freshwater Biology Committee. Seven of the species are new to the Austwick District, viz. *Chaetopteryx villosa* F., *Mystacides azurea* L., *Psychomyia pusilla* F., *Rhyacophila dorsalis* Curt. In addition he took *Rh. munda* McLach. of which there are only three county records, *Halesus auricollis* Pict. (taken in V.C. 64 only) and *H. guttatipennis* McLach, this being the second record from V.C. 64.

Mr. J. M. Brown has identified specimens collected by Mr. J. Wood. The following are from new localities : *Limnophilus lunatus* Curt. (64), Sunnydale, Morton, 6/10/48 ; Newsholme Dene (63), 28/8/48. *L. rhombicus* L. (63), Newsholme Dene, 10/7/48. *L. vittatus* F. (64), Ilkley, 6/7/48. *Chaetopteryx villosa* F. (63), Crimsworth Dean, Hebden Bridge, 2/10/48. *Philopotamus montanus* Don. (64), Shipley Glen, 10/3/48.

Ephemeroptera (John R. Dibb) : Reports received from various collectors all lead to the same conclusion, viz. that the present year has been an exceptionally good one for Mayflies. Lists of records and observations have been received from Messrs. Whitehead, Hincks, Cheetham and E. Thompson. These cover seventeen species noted from twelve localities within the County, and three new vice-county records noted below have been established.

A full list of Mr. Cheetham's captures will appear in the report to the Freshwater Biological Committee though we must mention here his very interesting observation of a cloud of *Ephemerella ignita* (Poda) depositing egg clusters on the road at the Traddock on June 22nd, and further detials in this connection will appear in *The Naturalist*.

My special thanks are due to Mr. H. Whitehead for keeping me in touch with Yorkshire workers.

New Vice-County Records

Heptagenia sulphurea (Müll.) (62). Helmsley District, 13, 17/6/49. Common in streams at Farndale and Gormire ; W. D. Hincks.

Leptophlebia vespertina (Linn.) (63). Worsborough, 1 ♂, 21/5/49 ; W.D.H.

Heptagenia lateralis (Curt.) (64). Austwick, Sheepdub, 20/6/49 ; C. A. Cheetham.

There have been some recent very useful and interesting additions to the literature of the Mayflies to which the attention of local students of the Ephemeroptera is drawn. On the taxonomic side T. T. Macan has published two papers, the first entitled ' The Taxonomy of the Nymphs of the British Species of the Genus *Ecdyonurus* (Ephem.) ' (*Ent. mo. Mag.*, lxxxv, 1949 : 64/70), in which the four species are shown to be separable in the final instar by differentiation of taxonomic characters, the author's material consisting of nymphal skins associated with the adults which had emerged from them. The second paper (*loc. cit.* 222-228) is titled ' Description of the Nymphs of the British Species of *Cloeon*, *Procloeon* and *Centroptilum*.' This includes a useful key to the species of the above genera and separates off the genus *Baetis*.

On the biological side, Professor G. C. Varley notes 'A Ceratopogonid Fly *Palpomyia semifumosa* Goet., feeding on Mayflies ' (*Ent. mo. Mag.*, lxxxiv, 1948 : 36-38). There is a beautiful figure of *Palpomyia semifumosa* Goet. ♀ feeding on the imago of the Mayfly *Rhithrogena semicolorata* Curt. photographically reproduced. In this connection it is recalled that Edwards noted *Palpomyia flavipes* (Mg.), a closely allied species to the above, feeding on a species of *Baetis*.

Orthoptera (J. M. Brown) : Mr. W. D. Hincks reports the following interesting species :

Metrioptera brachyptera (L.) (63). Thorne, 1♀, 9/49 ; W. Bunting.

Leptophyes punctatissima (Bosc.) (63). Thorne, 1♀, 9/49 ; W. Bunting.

Conocephalus dorsalis (Latr.) (61). Common at Long Bank Dyke, Kilnsea, 16/8/49 ; W.D.H.

Roeseliana roeselii (Hag.) (61). Skeffling, 2♂♂, 18/8/49 ; W.D.H.
Omocestus viridulus (L.) (62). Common in Helmsley district, 13-17/6/49 ; W.D.H.

Neuroptera (J. M. Brown) : Through the kindness of Mr. W. D. Hincks I was enabled to work through a box of Brown and Green Lacewings, mostly collected by Mr. J. Wood at St. Ives, Bingley (63). The following species were represented :
Eumicromus paganus (L.) (64). Shipley Glen, 9/8/47 ; J.W.
Hemerobius nitidulus F. (63). St. Ives, 4/6/46 ; J.W.
H. stigma Steph. (63). St. Ives, 31/8/46 ; J.W.
H. lutescens F. (63). St. Ives, 6/6/46 ; J.W.
H. atrifrons McL. (63). St. Ives, 7/6/46 ; J.W.
Chrysopa perla (L.) (63). St. Ives, 28/6/47 ; J.W.
C. vittata Wesm. (64). Ilkley, 4/7/46 ; J.W.
C. flava (Scop.) (63). St. Ives, 12/6/48 ; J.W.
Coniopteryx tineiformis Curt. (63). St. Ives, 20/7/48 ; J.W.

Hemiptera (J. M. Brown) : Once more through the kindness of Mr. Hincks I was enabled to work through a box containing an assortment of Hemiptera. As was likely to be the case, many of the species represented were common and widely distributed ones, but a good number were less common and of considerable interest. These included the following :
Acanthosoma haemorrhoidale L. (64). Bishop Wood, Selby, 22/9/46 ; W.D.H.
Elasmostethus griseus L. (62). Mulgrave Woods, 18/6/46 ; W.D.H.
Picromerus bidens L. (64). Askham Bog, 30/7/48 ; J.W.
Zicrona caerulea L. (63). St. Ives, Bingley, 8/5/48 ; J.W.
Stygnocoris fuligineus Geoff. (61). Spurn, 17/7/48 ; W.D.H.
Tingis ampliata H.S. (61). Spurn, 19/7/48 ; W.D.H.
Empicoris vagabundus L. (64). Leeds district, 5/6/47 ; W.D.H.
Xylocoris cursitans Fall. (65). Masham, 18/10/47 ; W.D.H.
Myrmedobia inconspicua Doug. (63). St. Ives, Bingley, 8/9/45 ; W.D.H.
Pithanus märkeli H.S. (61). Spurn, 21/7/48 ; W.D.H.
Calocoris striatellus F. (63). Bingley, Beck Foot, 12/6/48 ; J.W.
Miris striatus L. (63). St. Ives, Bingley, 26/6/48 ; J.W.
Deraeocoris ruber L. (64). Oakwood, Leeds, 7/8/47 ; W.D.H.
Atractotomus magnicornis Fall. (64). Brayton, Selby, 23/6/44 ; W.D.H.
Macrotylus paykulli Fall. (61). Spurn, 17/7/48 ; W.D.H.
Harpocera thoracica Fall. (64). Roughside, Shipley Glen, 22/5/48 ; J.W.
Rhopalotomus ater L. (64). Horton-in-Ribblesdale, 5/7/42 ; W.D.H.
Kleidocerys ericae Horv. (63). St. Ives, Bingley, 1/11/47 ; J.W. : 12/8/44 ; W.D.H.
Globiceps flavomaculatus F. (63). St. Ives, Bingley, 28/6/47 ; J.W.

A few specimens of water-bugs from Mr. H. Whitehead included *Gerris lacustris* L. and immature *Corixa* sp. from Worsborough Reservoir, 22/5/49.

Hymenoptera (W. D. Hincks) : The brilliant summer of 1949 will long linger in our memories for its sunshine but entomologists are unlikely to remember it for its insects. It may seem that entomologists are never satisfied but there are certain climatic conditions which must be fulfilled before an outstanding season for insects can be experienced. These conditions were not all fulfilled during the past season. For instance the mild winter of 1948-49 had an adverse effect on insect life. It is known that insects thrive best after a normal or even hard winter. After a mild one some species fail to appear, others are over before their normal time, and yet others, such as the Aphids, tend to be abnormally abundant.

The season certainly opened well as far as Hymenoptera are concerned and the abundance of early aphids gave a marked impetus to their parasites, the Aphidiidae. But the early abundance of these parasites suffered a marked diminution during the hot dry summer. The drought affected most groups of Hymenoptera and the larger Ichneumonids which may be expected in July and August virtually failed to materialise at all. In contrast, during July 1948 swarms of Ichneumonids were found at Spurn but during our visit in August this year hardly any were taken.

The Sawflies of May and June were plentiful this season but the second broods of the doubly-brooded species hardly appeared at all as far as the recorder's

experience goes. Aculeates appear to have suffered less than other groups of Hymenoptera and at Spurn in August the Bombi were in great numbers. But at the roots of marram tufts in the sand, where shallow depressions had been formed by wind action, there were eddies of dead insects including vast numbers of ants (*Myrmica* sp.) together with smaller numbers of many other insects. One presumes that these insect mortuaries were a direct result of the severe drought and the burning heat of the sun on the sparse vegetation of the sandhills. At the same time it must be remembered that in August spring and summer insects are dying off and some of the carcases in the eddies were certainly there as a result of a natural and usual process.

The recorder has collected a considerable number of Hymenoptera in the county this year, at Worsborough in May, in the Helmsley District at Rievaulx, Riccaldale, Farndale, Lastingham, Hutton-le-Hole, etc., in June, at Spurn in August, at Howden, Holme-on-Spalding Moor, Skipwith, Allerthorpe and Barlow in September, and later in the same month at Austwick. The Rev. T. B. Kitchen, Messrs. John Wood and W. A. Thwaites have also contributed interesting specimens.

In this remarkably long season collecting is hardly finished and the task of identifying the diverse results of the field work has hardly begun so that it is not possible at this early date (October 20th) to present a list of additions to the county fauna. Such a list will be prepared and offered to the editor of *The Naturalist* later. It is sufficient to say here, perhaps, that the additions are likely to be quite considerable because besides the results of current collecting good progress has been made in working out a small part of the large accummulations of previous years' undetermined material.

BOTANY

(Chris. A. Cheetham).—The Report of the Phenological Committee will give details of the effect this abnormal season has had on the vegetation.

The Union's excursions certainly profited by the dry weather and at some meetings, noticeably at Worsborough the attendance was exceptionally large but transit worries reduced the attendance at places difficult of access like East Witton and unfortunately the future gives little hope of improvement nor is the task of finding catering places likely to be any easier. Memories of Thirsk in 1948 were revived by the efficient way the Harrogate people got us to our working grounds at Whitsuntide.

Unfortunately the Ecological Section still suffered owing to the illness of Mr. A. Malins Smith. We trust he may be with us in 1950.

Our bryologists held two satisfactory sectional meetings and the reports of individual members' work given in *The Naturalist* show that interest in the mosses is well maintained.

The mycologists are to be congratulated on the success attained at their Spring and Autumn Fungus Forays.

In *The Naturalist* we find other sides of botanical work. Mr. W. E. L. Wattam's studies of seeds and seedlings are the result of much patient and detailed work, this also applies to the ecological material brought together by Messrs. Tordoff and Dearing. A useful paper on Microscopic Measurements is unfortunately the last we shall get from its talented author, the late T. Petch, by whose death we lose one of our senior Vice-Presidents. Another loss to the botanical world is the death of Mr. Albert Wilson. His interests were in a wider field than Yorkshire and it is only older members of the Union who recall him in the field when he lived in Ilkley and Sedbergh.

Plant Records (W. A. Sledge) : The past year has been a memorable one for the exceptionally fine weather experienced throughout the spring and summer, and comments will be found elsewhere in this report upon its effect on flowering and fruiting. Union excursions were not on the whole productive of many interesting discoveties though the two hybrid sedges detected by Mr. Shaw at the Harrogate meeting are both notable records. As usual Mr. John Brown's energy and enthusiasm has been rewarded by several important discoveries in the south-western part of the county, his rediscovery of *Carex digitata* at Roche Abbey being particularly interesting.

The outstanding discovery of the year is *Deyeuxia neglecta* found in some quantity at Tarn Moss, Malham, and reported in *The Naturalist*, 1949, 155. Its

claim to inclusion in the flora of the county has rested on a century-old gathering from Castle Howard, and it is to be hoped that the interest aroused by its reinstatement in our flora will stimulate botanists to search for it again in the old locality and clear up the problem of its survival or extinction there.

The gain of this rare plant is unfortunately offset by the loss of an equally rare species. Some years ago the late Dr. J. M. Taylor rediscovered *Viola stagnina* in peaty, scrub-covered land on the margin of Thorne Moor (see *Naturalist*, 1943, 77-78). The same year it was also found in a second locality near Askern but was destroyed soon after its discovery there by drainage operations. During and since the war the ever-increasing areas brought under cultivation led to the clearance and ploughing up of ground near to the station for the Violet and when I revisited the locality last June it was clear that unless arrangements could be made for the acquisition of the land, the plant would soon be destroyed. The matter was reported to and taken up by the Yorkshire Naturalists' Trust but it proved impossible to come to an agreement with the farmer either for the purchase of the land or for the halting of further clearance and ploughing. By the time these words are in print, therefore, one of the very few surviving British localities for this plant will have been converted into a potato field. When efforts to secure its preservation had failed some sods were removed to the nearest suitable ground not scheduled for clearance.

Fumaria parviflora Lam. (61). Cornfield by Kelleythorpe Marsh, Driffield ; R. Lewis. The second record for East Yorks., the first being from Staxton, see *Naturalist*, 1943, 118.

Cardamine latifolia Vahl. (Det. J. E. Lousley) (62). Church Becks, Scalby ; H. Rowntree. Native of Pyrenees and an addition to the British list.

Sisymbrium Sophia L. (62). Thorntondale ; H. Rowntree.

Diplotaxis muralis (L.) DC. var *Babingtonii* (Syme) (63). By railway crossing between Finningley and Auckley ; J. Brown.

Cardaria Draba (L.) Desv. (*Lepidium Draba* L.) (63). Cultivated ground between Maltby and Tickhill ; J. Brown.

Bunias orientalis L. (61). Between Spurn Head and Kilnsea ; Dr. T. E. T. Bond.

Viola Reichenbachiana Bor. (63). Beckfoot, Bingley, 1947 and 1948 ; F. Peverett per A. Malins Smith. (64). Wood near Ilkley Golf Links, 1948 ; Miss Malins Smith per A.M.S.

V. Reichenbachiana Bor. × *Riviniana* Rchb. (63). Beckfoot, Bingley, 1947 ; C. Nelson per A. Malins Smith. Determined as probably this hybrid by Dr. D. H. Valentine.

Viola odorata L. var. *subcarnea* (Jord.) (Det. S. M. Walters) (62). Thorntondale ; H. Rowntree.

Agrostemma Githago L. (63). Plentiful in oat field between Maltby and Tickhill ; J. Brown.

Vicia sylvatica L. (61). In Pocklington Wood, between Pocklington and Millington ; R. Lewis. Only recorded from two localities in Robinson's Flora.

Potentilla recta L. (62). Cloverfield between Crayke and Huby ; A. W. Ping. (64). Field south of Askham Bog ; L. F. Merton.

Alchemilla glabra Neyg. (64). Malham, abundant ; S. M. Walters.

A. xanthochlora Rothm. (64). Malham, fairly common ; S. M. Walters.

A. vestita (Bus.) Raunk. (64). On the lawn at Malham Tarn House ; S. M. Walters.

A. Wichurae (Bus.) Steph. (64). Waterhouses, Malham, and laneside to Dale Head Farm, Penyghent ; S. M. Walters.

A. minor Huds. (64). Mastiles Lane, Stangill and Dale Head Farm ; S. M. Walters.

A. conjuncta Bab. (64). Near Tarn House, Malham, probably as a garden escape ; S. M. Walters.

Smyrnium Olusatrum L. (61). In parkland outside churchyard of St. German's Church, Winestead, near Patrington, April 30th, 1949 ; R. Lewis. The second record from district No. 2 of Robinson's *Flora*, the first being a record made by Robert Teesdale from near Beverley, for which we have no recent confirmation. The only other East Riding record of recent date was made by Thomas Stainforth from Catwick in Robinson's No. 1 District, in 1939, and published in the *Supplement to the Yorkshire Floras*.

Apium inundatum (L.) Rchb. f. (61). In muddy pond in a field near the road between Roos and the east end of Halsham, near Withernsea ; R. Lewis. Only recorded from two localities in Robinson's *Flora*.

Gnaphalium sylvaticum L. (63). At Gorple in the roadway between the two reservoirs in quantity. Last record for the Halifax parish, 1896 ; F. Murgatroyd.

Petasites fragrans (Vill.) C. Presl (63). Several patches not in proximity to houses, besides pathway along the side of the gorge leading from Maltby to Roche Abbey, in flower on February 19 ; Dr. R. G. Abercrombie.

Senecio erucifolius L. (61). On roadside bank near the top of England Hill, near Withernsea ; R. Lewis. Only recorded from two localities in Robinson's *Flora*.

S. squalidus L. (61). One plant on the Spurn peninsula ; M. F. M. Meiklejohn.

Cirsium dissectum (L.) Hill (63). Wet pasture between Maltby and Tickhill ; J. Brown.

C. dissectum (L.) Hill × *C. palustre* (L.) Scop. *(64). One plant at Askham Bog ; L. F. Merton. New to V.C. 64 and only previously recorded in Yorkshire from Skipwith Common.

Carthamus lanatus L. (Det. W.A.S.) (62). Thorntondale ; H. Rowntree.

Lactuca hastata Det. Kew (63). Bingley ; P. Jefferson. Presumably the same as the plant which has previously been recorded as *L. macrophylla* Gray.

Tragopogon porrifolius L. (64). Two plants in a lane about a mile from Clifford, Boston Spa ; Miss R. Kilby.

Andromeda polifolia L. (64). Sparingly on Tarn Moss, Malham ; E. J. Douglas.

Veronica filiformis Sm. (63). Goit Stock near Bingley ; F. Peverett per A. Malins Smith.

Chenopodium polyspermum L. (63). Rubbish dump, Arbourthorne, Sheffield ; J. Brown.

C. ficifolium Sm. (63). With the preceding ; J. Brown.

Chenopodium murale L. (63). With *C. polyspermum* and *C. ficifolium* ; J. Brown.

C. hybridum L. (63). Sent to me from a rubbish dump in Wakefield by Miss R. Kilby.

C. cristatum (F. Muell.) F. Muell. (Det. J. P. M. Brenan) (63). Arbourthorne, Sheffield, with the preceding ; J. Brown.

Salsola pestifer Nelson (63). With *Chenopodium* spp. at Arbourthorne, Sheffield ; J. Brown.

Rumex longifolius DC. (64). Tarn Moss, Malham, *teste* R. Greig-Smith per E. J. Douglas.

Euphorbia virgata Waldst. & Kit. (62). The Mill, Thorntondale ; H. Rowntree.

O. latifolia L. sec. Pugsl. (Det. V. S. Summerhayes) (63). Damp meadow between Tickhill and Sandbeck ; J. Brown.

O. latifolia × *O. praetermissa* Druce. (Det. V. S. Summerhayes) (63). Most of the marsh orchids with the preceding were so identified but neither at the time of gathering nor on a later visit could *O. praetermissa* be found ; J. Brown.

Polygonatum odoratum (Mill.) Druce (*P. officinale* All.) (64). Dean Moor Hill Scar, Malham ; E. J. Douglas.

Juncus tenuis Willd. *(62). Path side, Strensall Common ; R. Lewis and others, Y.N.U. Excursion. New to V.C. 62. (63). Canal bank near Luddendenfoot Bridge ; F. Murgatroyd.

Luzula sylvatica (Huds.) Gaud. (61). In small quantity, Houghton Woods, Newbald ; R. Lewis. New to District No. 6 of Robinson's *Flora* and only recorded from one locality in his District No. 2.

Eleocharis uniglumis (Link) Schult. (64). Tarn Moss, Malham ; S. M. Walters.

Rynchospora alba (L.) Vahl. (64). Helwith Moss ; C. A. Cheetham and Mrs. Appleyard. See *Naturalist*, 1949, 155.

Carex digitata L. (63). Near Roche Abbey, a few plants ; J. Brown. An interesting rediscovery of an old station.

C. distans L. (63). Between Maltby and Roche Abbey in two places. First recorded from West Yorkshire from this area by G. E. Smith over a century ago. Also between Tickhill and Sandbeck in very small quantity ; J. B.

C. lepidocarpa Tausch × *C. Hostiana* DC. (64). Great Close Mire, Tarn Moss and other calcareous marshes on Malham Moor ; leg. et det. S. M. Walters.

C. Otrubae Podp. × *C. paniculata* L. (*C. Boenninghauseniana* Weihe) (64). Oakdale Beck, Harrogate ; G. A. Shaw.

C. remota L. × *C. Otrubae* Podp. (*C. axillaris* Good.) (64). Scotton Banks, Knaresborough ; G. A. Shaw.

Deyeuxia neglecta (Ehrh.) Kunth (*Calamagrostis neglecta* (Ehrh.) Gaertn., Mey.

and Schreb.) (64). Fen Carr, Tarn Moss, Malham ; D. Coombe and E. J. Douglas. A very interesting discovery (see *Naturalist*, 1949, 155).

Catabrosa aquatica (L.) Beauv. (63). Fine and plentiful in a ditch by the railway at Bawtry just within the county ; J. Brown.

Glyceria fluitans (L.) R.Br. × *G. plicata* Fr. (*G. pedicellata* Towns.) (64). Great Close Mire, Malham Moor, with both parents ; S. M. Walters.

G. declinata Breb. (64). Great Close Mire, Malham Moor ; S. M. Walters.

Equisetum Telmateia Ehrh. (61). In fair quantity on a steep boggy bank near a spring head, Millington Beck, near Pocklington ; R. Lewis. New to District No. 3 of Robinson's *Flora* where it is only recorded from two localities in his Districts Nos. 1 and 2 respectively.

Ecological Comittee (Miss D. Hilary) : The two special pieces of ecological work undertaken by members of the Committee, viz.—(*a*) The Degeneration of Juniper on Moughton Fell and (*b*) The Ecology of a Heather Moor at St. Ives, Bingley, are both nearing conclusion.

(*a*) *The Degeneration of Juniper on Moughton Fell.*

In last year's report it was mentioned that a number of samples of Juniper wood, taken near the base of dead bushes, had been collected and it was hoped that when examined they might throw some light on the age at which death occurs. I am glad to say that Mr. Malins Smith has now been able to examine them and sends the following report.

The wholesale dying out of Juniper on the area between Thieves Moss and the Crummack-Selside footpath has already been reported. It was thought that further examination of the dead Juniper might shed light on the cause of this. Also it was thought desirable to see if the remarkable spring of 1947 with its long succession of days of low temperature and its abundant and long-continued snow covering had had any special effects on the Juniper. With these objects in view our General Secretary and Mr. G. A. Shaw visited the area on December 27th, 1947 (the weather of the winter of 1947-48 having been comparatively mild up to that date). Mr. Shaw reported ' As far as I can see there has been no change from the position when I last visited the area in 1946, and nothing which could be put down to the frost of last winter (*i.e.* February and March, 1947). C.A.C. says he noted a few odd bits on the exposed part east of the Horton path which had been killed (he thought) by icing up which occurred one day during last winter. He put this down not to the extreme cold but to the fact that the leaves were completely sealed up by ice.'

Dead stems of Juniper, cut from near the base, were taken from four places in the area S.E. of Thieves Moss, beginning at the N.W. end of the area and working towards the S.E. In position I there were still one or two living trees ; in position II there were none ; in position III there were a fair number still living (this was from a somewhat sheltered depression). At IV all trees were dead. Thirteen stems were cut in all, four from position I, and three each from the other positions. The stems were cut and polished so that the annual rings could be counted and the results were :

Position I. 45, 52, 66 and 66 years old.
,, II. 33, 53, and 72 years old.
,, III. 53, 55, and 64 years old (this last tree not all dead).
,, IV. 53, 67, and 76 years old.

The total number (13) is too small for statistical treatment, but the range (from 33 to 76 years) is fairly wide and precludes any idea of the Juniper here having formed a stand of even age, an idea which otherwise might be invoked to account for the almost simultaneous death of the trees of this area. At the same time the range is much smaller than occurs in the healthier area near Juniper Valley, where plants range from seedling age to 250 years (approx.). There may be some significance in the fact that 5 of the 13 stems lie within the narrow range of 52-55 years and it is probable that we must picture the majority of the trees of this area as having been seedlings under 60 years ago.

Further examination of the samples as to the condition and structure of wood and bark is intended and may throw some new light on the problems under discussion.

The Ecology Committee is much indebted to Messrs. Cheetham and Shaw for paying this visit in very trying weather conditions and for obtaining the samples.

Mr. Cheetham has recently visited the Thieves Moss and Moughton Juniper areas and sends the following observations :

After a year's absence I expected to see a good deal of alteration but I found very little and I came to the conclusion that the trouble has fairly well ceased. The area to the N.W. of the Moughton Lane-Horton Station footpath is practically denuded of Juniper with the exception of a little area to the N.E. of the small 1,200 ft. area as shown on the 6 ins. sheet. Here several, say one in five, of the remaining bushes show signs of degeneration. On the south side of the footpath the Juniper looks healthy and there is little evidence of trouble. The few scattered dead bushes to the south of the point where the path reaches the top of the limestone cliff have been there for some considerable time and have nothing to do with the Thieves Moss trouble. My opinion is that this clearance will not go further. In the past the evidence shows a heavy attack and then an end in other areas ; one was in the Horton area west of Moughton plantation above the 1,200 ft. contour, another on the Long Scar which lies west of the Thieves Moss area. From the available information I think this Long Scar clearance occurred around 1880-1900.

Mr. Hincks thinks that the damage may be due to a weevil, a well-known pest on Conifers, both on the Continent and in America. He has found the adults on the Moughton Juniper in considerable quantities but as yet has no data concerning the number of larvae which are root-feeders and are found in the soil around the Conifer roots.

Mr. Wattam reports that the seedling Junipers in his garden are still living and making good progress.

(*b*) *The Ecology of a Heather Moor at St. Ives, Bingley.*

In last year's report it was noted that one of the gaps in our investigations was the account of the regeneration after burning. This gap has now been filled by the following report sent by Mr. Malins Smith :

As was stated in Reports on Heather Moor Ecology at St. Ives (No. 1, *Naturalist*, 1945, No. 2, *Naturalist*, 1947), the investigation area at St. Ives was cleared of vegetation by burning in August, 1944. The area has been examined more or less completely on the following dates since :

November 25th, 1944 by A. Malins Smith.
July 7th, 1945 ,, ,, ,,
September 8th, 1945 ,, ,, ,,
September 15th, 1946 ,, R. P. Libbey.
April 1949 ,, Miss D. Hilary and Mr. and Mrs. A. Thompson.

It is hoped to continue observations and present a fuller account of the re-establishment of the plant covering on the burnt area (which is by no means complete) later, but the following facts may be recorded here :

I. At all the visits the chief coloniser of the burnt ground was ling (*Calluna vulgaris*) which had spread almost entirely by seeds, though a few new shoots derived from partly burnt plants were observed.

II. *Erica tetralix*, most probably spread by seed, was first noticed in September, 1946, though possibly present before as small seedlings would not be easily recognised. By 1949 it was increasing and beginning to take its former rôle as the most common plant in the area next to ling, though occurring far less frequently than the ling.

III. *Eriophorum vaginatum* spreading chiefly from old partly-burnt stools, but more rarely by seedlings, became increasingly common, and occupies now a more prominent position than before the burning.

IV. *Eriophorum angustifolium* spreading rapidly from old stools had greatly increased in the autumn of 1945, but since then has taken a less prominent position and was not noticed at all in April, 1949.

V. *Scirpus caespitosus*, *Deschampsia flexuosa* and *Juncus squarrosus*, have now attained pretty much their former status in the area, the *Scirpus* fairly common, the *Juncus* and *Deschampsia* occasional.

VI. Casual interlopers, *Stellaria media*, *Epilobium angustifolium*, and *Poa annua* have come and gone.

VII. The tree stage has made its appearance, beginning in 1946 with Birch seedlings, continued in 1949. Birch occurred prior to the burning, but was kept down by sheep.

VIII. The moss *Campylopus pyriformis* has been an abundant coloniser of

the burnt ground and is still common. It will probably recede in status when the ling becomes denser, to the position it occupied before the burning.

Perhaps the most striking feature of the vegetation of the burn subsere compared with that of other areas which have been described is the absence of *Erica cinerea* which frequently acts as a pioneer coloniser of Callunetum after burning. *Erica cinerea* is present in the neighbourhood, chiefly on the verges of the Keighley-Harden road, but it is separated from the St. Ives area by a ten foot high wall and this obstacle has presumably prevented any seeds getting on to the St. Ives area.

Referring to the damage done by the Heather Beetle, Mr. Cheetham revisited the area on Smearsett Copys, which he took for a Heather Moor investigation (see *Naturalist*, 1942, 163 and 1943, 72) and sends the following observations :

This area suffered from Beetle attack in 1944 and a considerable portion had the whole of the *Calluna* killed off. To-day there is a fair covering of young plants up to two inches in height, and making a fairly solid mat of vegetation around the dead sticks of the old plants. One small area, say twenty yards square, has had these old sticks burnt off and on this portion there is very little new growth. I do not know the date of the fire. Higher up the hillside there is a part which escaped the beetles and shows the type of growth that covered the whole area previous to 1944.

Bryology (H. Walsh) : The section has held two field meetings at Plumpton Rocks and Bingley. A report on the former has appeared in *The Naturalist* and the only records of interest from Bingley are included in this report. Notes from members have been contributed to *The Naturalist* and the section has been represented at all the general excursions.

SPHAGNA—NEW V.C. RECORDS

S. compactum DC. var. *squarrosum* Russ. (65). Lane from Cowgill to Widdale Fell, July, 1947 ; A. Thompson. (*Trans. Brit. Bry. Soc.*, 1949, 215.)

S. compactum DC. var *subsquarrosum* Warnst. (65). North-east side of Whernside, July, 1947 ; A. Thompson. (*Trans. Brit. Bry. Soc.*, 1949, 215.)

S. auriculatum Schp. var. *canovirescens* Warnst. (62). Bank of Gormire Lake, May, 1948 ; A. Thompson. (*Trans. Brit. Bry. Soc.*, 1949, 216.)

S. auriculatum Schp. var. *plumosum* Warnst. (64). Moorland, Haverah Park, Harrogate ; A. Thompson. (*Nat.*, 1949, 164.)

MOSSES—NEW COUNTY RECORDS

Dicranum montanum Hedw. (64). Bolton Abbey Wood ; G. A. Shaw. (*Nat.*, 1949, 47.)

Grimmia retracta Stirton (64). Rock in stream, alongside of Long Lane, Studfold High Pasture, Horton-in-Ribblesdale ; C. A. Cheetham. (*Trans. Brit. Bry. Soc.*, 1949, 218.)

NEW V.C. RECORDS

Weisia tenuis C.M. (61). Winestead, Patrington, S. Holderness ; R. Lewis. (*Nat.*, 1949, 47.)

Zygodon conoideus Hook. and Tayl. (64). Whitewell, Hodder Valley ; G. A. Shaw. (*Nat.*, 1949, 97.)

Webera annotina Sch. var. *bulbifera* Cor. (63). Riverside, Jumples, Wheatley, near Halifax ; H. Walsh.

Other records of interest are :

Pleuridium alternifolium Rabenh. (63). Pasture field, Broadbottom, Mytholmroyd. First record for R. Calder drainage area ; H.W.

Dicranella Schreberi Schp. (64). Golden Acre Park, Cookridge, near Leeds ; G.A.S.

D. Schreberi Schp. var. *elata* Schp. (63). Cragg Vale, near Mytholmroyd ; H.W. A previous record for 63 in *Brit. Bry. Soc.* records, but not in List of Yorkshire Mosses (1945).

Campylopus atrovirens De Not. var. *gracilis* Dixon (64). Beezley Glen, Ingleton ; G.A.S.

Fissidens pusillus Wils. (63). Bingley, on gritstone by stream ; J.A.

F. viridulis Wahl. (63). Hardcastle Crags ; H.W.

Pottia minutula Fuer. (64). Jackdaw Crag Quarry ; H.W.

Barbula sinuosa Braithw. (64). Oxenber, Austwick ; C.A.C. Stones by Nidd above Goyden Pot ; G.A.S.
Trichostomum tenuirostre Lindb. (63). Hardcastle Crags ; H.W.
Encalypta ciliata Hoffm. (65). cfr. Crags east of Stone Gill Foot ; G.A.S.
Ulota Bruchii Hornsch. (65). cfr. Hebblethwaite Gill, near Sedbergh ; G.A.S. Near Dandra Garth, Garsdale ; G.A.S.
Discelium nudum Brid. (63). Clay bank by stream, Marley, near Bingley ; H.W.
Ephemerum serratum Hampe. (63). Pasture field, Broadhead Valley, Cragg Vale ; pasture field, Foster Clough, Mytholmroyd ; H.W. A minute moss, probably more common than records suggest ; only recorded in Halifax Parish by A. Leyland, 1834, and J. Nowell, Todmorden, 1854.
Hypnum crista-castrensis L. (65). Penny Farm Gill, near Sedbergh ; G.A.S.
H. giganteum Schp. (63). Balne Ponds ; W.A.S. A previous record for 63 in *Brit. Bry. Soc.* records but not included in List of Yorkshire Mosses (1945).

Hepatics—New County Records

Riccia bifurca Hoffm. (64). Austwick ; C. A. Cheetham. (*Nat.*, 1949, 97.)
Pallavicinia Lyellii (Hook.) Gray (64). Austwick Moss ; K. Mattinson. (*Nat.*, 1949, 18.) Ingleton ; Mrs. J. Appleyard. This second record within the year is noteworthy in such well-known areas as Austwick and Ingleton. The gatherings were all archegonial thalli and associated with them were *Calypogeia trichomanis, Lophocolea bidentata* and *Campylopus pyriformis*, all well distributed bryophytes.
Lophozia silvicola Buch. (63). Hardcastle Craggs, Hebden Bridge ; H. Walsh.

New V.C. Records

Sphenolobus exsectiformis (Breedh.) Steph. (63). Hardcastle Crags ; H. C. Broome, 1912 (*Nat.*, 1949, 98).
Anthoceros punctatus L. (61). Field between Cottingham and Beverley ; J. Webster (*Nat.*, 1949, 47).

The following are new to positions gixen.
Riccia glauca L. (64). Field near Jackdaw Crag Quarry ; H.W. Austwick ; C.A.C.
Ricciocarpus natans (L.) Corda. (64). Acomb Ponds, York ; H.W.
Preissia quadrata (Scop.) Nees. (64). Jackdaw Crag Quarry ; H.W.
Aneura pinguis (L.) Dum. (64). Jackdaw Crag Quarry ; H.W.
Aneura sinuata (Dicks.) Dum. var. *major* Lindb. (64). Near Knaresborough ; J.A.
Metzgeria conjugata Lindb. (63). Hardcastle Crags ; H.W.
Harpanthus scutatus (Web. et Mohr.) Spruce (64). Ingleton ; H.W.
Calypogeia Meylanii Buch. (64). Picking Gill ; R. Lewis (*Nat.*, 1949, 156).
Madotheca Cordeana (Hnben) Dum. (64). Austwick ; J.A.
Lejeunea cavifolia (Ehrh.) Lindb. (63). Hardcastle Crags ; J.A.

Mycology (Miss J. Grainger) : We have held the usual two Forays, in spring at Hull, in autumn at Austwick. The attendance was not as large as in recent years but much good work has been done, the details of which will be published in *The Naturalist*.

The Committee have sustained a severe loss in the death of Mr. T. Petch of King's Lynn. After his return from Ceylon he was a regular attender at the Forays until his health made this impossible. He was a past President of the Union and Chairman of the Mycological Committee. His critical studies of *Xylaria* and *Hypoxylon* and his work on Entomogenous Fungi are notable contributions to mycological literature.

The weather of 1949 has not been sufficiently damp for large gatherings of Agarics and Myxomycetes but in August *Psalliota campestris*, along with other species of *Psalliota*, was sufficiently plentiful to be offered for sale by the wayside. Gatherings were still being offered at the end of September. Species of *Hygrophorus* in September, at Austwick, were few in number and there were very few individuals of each species. The results of the Austwick foray however exceeded expectations and several interesting species turned up, including the rare and remarkable *Collybia racemosa*. Both species of *Nyctalis* were abundant.

The Chairman's Address on Hybridisation in the Fungi touched on aspects of Mycology not previously dealt with.

BOOK REVIEWS

Island Going, by **Robert Atkinson.** Pp. 384 with 47 plates, 7 sketch maps and end-paper maps. Collins, 16/-.

In the early months of 1935 when still an undergraduate at Oxford and without any experience of the Western Isles, Mr. Atkinson conceived the notion of going to North Rona to investigate the habits of Leach's Fork-tailed Petrel. It was not until the summer of the following year that, with his friend John Ainslie, he achieved his objective after travelling north to Stornoway in an archaic, four-wheeled, self-propelled vehicle procured from a breaker's yard for 60/-. Together they spent a month of glorious isolation on Rona and even succeeded later in getting back home in ' the car.' In the five summers before the war Atkinson and Ainslie visited the Shiant, Monach and Flannan Islands, St. Kilda, North Rona and, most difficult of all, the gannet-clad outcrop of Sula Sgeir. The more remote and inaccessible the island, the greater its allurement and their determination to set foot upon it. Since the war he has added Rockall to the bag, though he has yet to land on that uttermost of all our outlying islands.

It may be doubted if Leach's Petrel would have received the attention it did had it elected to breed on less awkwardly situated islands ; for Mr. Atkinson's journeys were motivated at least as much by the spirit of adventure as by ornithological zeal. To say that is not to decry the careful observations made, often under extremely unpleasant conditions, and the resulting information which he has added to knowledge of the habits of this strange and rare bird. For though birds were the objects of study wherever he went, he was drawn to the islands for the same reasons which impel mountaineers to scale peaks.

Dr. Fraser Darling's books have already made the strange history of North Rona familiar, but Mr. Atkinson has much to add from a search of all the sources of information relating to that bleak and outlandish island and its previous inhabitants. He makes light of the discomforts which he and his companion suffered during their residence on the various islands ; and his zest for isolation and unfrequented places (and St. Kilda was scorned at first as being too much on the beaten track) is matched by the liveliness of his style. This entertaining, informative and beautifully illustrated book is a notable addition to the literature of the Hebrides which will both appeal to the sedentary adventurer who prefers to travel vicariously and will evoke pleasant memories mixed with nostalgic longings in those who have already fallen under the spell of the Western Isles.

W.A.S.

Birds in Action, by **Eric Hosking** and **Cyril Newberry.** Pp. 128 including 68 pp. illustrations, several in colour. Collins, 16/- net.

This is a picture book, with only short, slight paragraphs concerning the birds depicted, and with a chapter devoted to the technique of the photographic use of the high-speed, electronic flash. And what pictures ! Wheatear, Whinchat, Blackcap, Great-Tit, Blue-Tit, Spotted Flycatcher, Nightingale, Sedge-Warbler, Barn Owl, Redstart, Blackbird, Swallow and Sand-Martin are all shown on the wing, feather perfect. In some cases the use of the flash has produced a rather unpleasantly black background ; effects of sunlight remain more natural than those of flood-lighting, though less dramatic. Surprisingly little false tonality in the main subject-matter can be detected. Several species are shown in action at a bathing pool. Five pages are devoted to waders at high tide on Hilbre Island, and were taken by daylight. The reactions of Nightingales to a stuffed Cuckoo placed near to their nest, and of Blackbirds to a stuffed Jay, are shown ; but with a live Cuckoo or Jay instead of an immobile dummy behaviour might have been different. Birds appear to take very little notice of the momentary flash, much less than might be expected from the agonised expression worn by a well-known Yorkshire naturalist whose face also appears in one picture ! The intimate pictures of the home life of a Blackcap, of Nightjars, and of a pair of Scottish Crossbills are very attractive and valuable.

It is rather a pity that the authors should claim to have pioneered the application of flashlight to the photography of birds ; that was done many years ago by J. A. Speed and others. Nor do we agree that modern plates permit better gradation of tone than formerly ; or that modern cameras possess greater rigidity. All interested in the subject of bird-photography should possess this book ; which probably contains more new-style, perfect, even unique, photographs of birds than any other.

R. C.

Birds of the Coast, by **C. A. Gibson-Hill.** Pp. xxxii+216, with 31 photographs by the author and other well-known bird photographers and numerous text figures. Witherby, 10/6.

A useful book as regards the larger birds likely to be seen on our coasts, from Falcons to Auks, especially concerning Geese, Ducks, Grebes, Divers, Waders and the Laridae. Numerous well-drawn illustrations in black and white illuminate the text ; and with several related species shown together, place ' emphasis on the arrangement of light and dark tones in the plumage ' which the author considers to be more constant under varying conditions than colour. The summer and/or winter distribution of many species is indicated on a series of maps which have been drawn ' to give a general impression of the range rather than the precise data for individual localities.' Northumberland is omitted from the Goosander's breeding range. Inland frequency of most immigrants is not attempted. The mention of the breeding of the Little Ringed Plover is apparently too recent to include Yorkshire. Breeding data are given in tabular form. Morphological terms are explained in diagrams.

Passerine birds are dismissed in less than twelve pages. No mention is made of a number of species that breed in some places normally within a few yards or even feet of the actual coast-line (*e.g.*, Linnet, Reed Bunting, Skylark, Dipper, and Nightjar) ; nor of the hordes of passerines that migrate in spring and autumn across and along the coast, some of which stay for varying periods (*e.g.*, Greenfinch, Chaffinch, Robin, Goldcrest, Blackbird, Fieldfare, etc.).

The book can be recommended as containing much useful information *in parvo* and is of convenient size. But fully and adequately to deal with the birds to be seen on all our coasts throughout the year in one volume is impossible without much more detailed information than one person can possess. No book dealing with the coasts of Britain can be up to date without the information to be derived from the work of the Bird Observatories ; nor will it then remain up to date for long. R. C.

Audubon's American Birds. Batsford Colour Books, No. 4. Pp. 12. 18 plates in colour. Introduction and notes on the plates by Sacheverell Sitwell. 6/6.

This book is produced with the same elegance and the same taste as its predecessors, and the sixteen pictures selected are the best reproductions we have seen of Audubon's work.

In one of his notes to the plates, Mr. Sacheverell Sitwell, in a characteristic passage, describes a number of large white birds he once saw sitting on a tree. ' Could they be magnolias ? ' he coyly asks his readers. No, he tells us, they were Ibises. This episode, it seems, took place in Morocco, an area where no white species of Ibis occurs. Were the objects seen by Mr. Sitwell just as likely to have been magnolias, after all? Yes, just as likely.

This is a measure of Mr. Sitwell's ornithological attainments. It would be a less serious matter in a work that is primarily pictorial if his publishers had not stated on the dust-jacket that the introductions to this series are each written by a ' recognised authority,' and if they had not spoken of ' his usual learning.' (The versatile Mr. Sitwell, it seems, is also a ' recognised authority ' on Romantic Ballet and the fashion-plates of the early nineteenth century.) A reputable firm such as Messrs. Batsford should be above this type of publicity. If Mr. Sitwell is an authority (recognised or unrecognised) on birds, the fact is cunningly concealed, as a glance at the notes will show. Nor does he appear to be an authority on Audubon, his factual information concerning whom (two paragraphs out of twelve pages) could be derived from any standard reference work.

Of Mr. Sitwell's literary merit one may judge from the following sentence, perhaps one of the most richly comic in modern *belles lettres* : ' it is impossible,' he says, ' looking at the spoonbill among the reeds, not to be reminded of the duck-billed women of the Congo.'

And what of his ' usual learning ' ? It consists largely of heterogeneous information that has little to do with either Audubon or the birds of America : a disquisition on fighting cocks, for example, is allowed greater space than Audubon himself.

Mr. Sitwell omits to tell us where Audubon is buried, but, wherever it may be, it is likely that, in his grave, the great man has performed a series of indignant revolutions. M. F. M. M.

Snowdonia. The National Park of North Wales, by **F. L. North, Bruce Campbell** and **Richenda Scott.** Pp. 469 with 104 plates, 56 in colour, 6 maps and 25 diagrams. 'New Naturalist,' Vol. 13. Collins, 21/-.

This is the first of a series of regional surveys planned for publication in the 'New Naturalist' series, each to be devoted to the geology, plant and animal life and historical background of our projected National Parks. It covers a broader field than others in the series as it is planned to meet the more varied interests and requirements of a wide range of visitors; and no discerning visitor could either resist or afford to dispense with so much information so attractively put together.

The complex geology of the area is ably described by Dr. North, whose interpretation of the landscape in terms of the history of its rocks cannot fail to heighten appreciation of Snowdonian scenery. Dr. Bruce Campbell has contrived to cope successfully with the difficult task of doing justice to both the flora and fauna. He writes with authority on the bird and wild animal life of the area and has had the assistance of the best resident botanists to supplement his own wide knowledge of the flora. This section of the book is treated ecologically with chapters or sub-chapters devoted to the alpine zone, the grassland zone, lakes and rivers, woodlands, farmlands, the Conway valley and the Caernarvonshire and Anglesey coasts. There is in addition an appendix giving useful lists of the flowering plants and ferns and the vertebrate fauna, and a summary of recorded species in the various orders of insects and other invertebrate groups. The botanical nomenclature used in the body of the work does not always agree with that in the appendix, and one wonders to what species of pondweed the strange name *Potamogeton oblongifolius* refers, why *Lloydia* is described as having four petals and why *Mibora* and *Juncus capitatus* —surely two of the plants specially associated with Anglesey—should receive no mention in the paragraphs dealing with its dune vegetation. Dr. Richenda Scott writes on the archaeology and history of the area, touching on many points concerning past social and economic developments and how they have helped to shape the rural life of to-day.

The book is generously illustrated with photographs, figures and maps. Some of the colour plates are good but, as in the other volumes, the monochromes are more satisfying. W.A.S.

Both Sides of the Road. A book about farming, by **Sidney Rogerson** and **Charles Tunicliffe.** Pp. 183 with 23 coloured and 107 black and white illustrations. Collins, 21/-.

It is always difficult to write a book about farming. If the book is for the practical farmer many statements made by the writer from his experience will be susceptible to modification and criticisms by the readers because of their different circumstances and experiences. If the book is for the non-farming reader it is easy for generalisations to be misleading; for the summer-time glamour of farming to be exaggerated and the seven-day-a-week all-the-year-round hard work to be understated.

Fortunately, Mr. Rogerson, who is responsible for the text of this very useful book, is aware of all this. He makes it clear in his Foreword that the book is not intended for the expert; that farming is a subject full of controversy and that generalisations are apt to be open to attack. The reader who takes good note of the wise remarks in the Foreword will get greater value from the book by recognising that it gives general and interesting information without being categorically descriptive of the whole of British farming. The book is written for the non-agricultural reader, and primarily for younger people although we shall not quarrel with the hopes of the publishers, expressed on the dust cover, that older people may welcome it.

Two chapters are devoted to the changes in the type of farming as one travels through different parts of the country, and it is important for people to realise how very varied the farming on this little island is. Two chapters deal in a general way with soil and its fertility. Most of the sixteen chapters deal with crops and stock and the book concludes with two chapters 'The Modern Farmer' and 'The Farmstead.' These concluding chapters are of particular importance since they include a brief account of the developments of the application of modern industrial methods to farming combined with the preservation of much of its ancient tradition. Opinions may vary on the relative emphases to be put on these, but it will be agreed that the author's account is a valuable part of the book.

Mr. Tunicliffe contributes 23 full-page coloured illustrations and over 100 black and white sketches, all of which are excellent.

The book is well written and very readable, and with its illustrations will be an asset to every reader who is careful to note the wisdom of the Foreword.

N.M.C.

Old Caillie, by **Arnt Hvidsten.** Pp. viii+172 with 13 illustrations from drawings by the author. Translated from the Norwegian by M. A. Michael. Wm. Hodge & Co., Ltd., 9/-.

One year in the life of a hen Capercailzie, no doubt just an ordinary year, but the account as given by Mr. Hvidsten makes a most gripping story. He wastes no words but his matter, terse, balanced and sound, fires the imagination : one feels to be living *with* ' Old Caillie,' sharing her joys and sorrows, her peace and her fears. The story of the hatching out and development of her family is engrossing and a keen pang is felt at each loss. The descriptive writing is fine ; particularly vivid are the accounts of the courtship display, of a thunderstorm in the mountains and of the death struggle between Eagle Owl and Pine Marten.

Mr. Hvidsten writes with that knowledge which comes only from long personal contact with his subject and at the end of the book, most bird lovers will know much more about Capercailzies. The Capercailzie became extinct in the British Isles during the eighteenth century but was re-introduced into Scotland from Sweden in 1837 and now occurs at several localities.

The illustrations from the author's own drawings are good and well chosen.

J. P. U.

Mammals and Birds, by **David Seth-Smith.** Pp. 198 and 23 black and white illustrations. Herbert Jenkins, Ltd. 7/6.

This addition to the publisher's ' Reason Why ' Series has been compiled by an author who can speak with authority on the subject discussed and also on the type of question asked. He has selected some 300 questions from the thousands which he must have answered verbally at the London Zoological Gardens and the result is this useful and instructive collection. It is a book to which reference can be made both by young and old with the confidence that there will be a careful answer to their enquiries. Besides answering plain factual questions, Mr. Seth-Smith deals with some popular beliefs, exploding or confirming them as the case may be and the reviewer must confess that, never having heard the story of the fox and the fleas, he found it very entertaining. There is no doubt that this reliable little book with its straightforward and unpretentious answers will have considerable appeal.—J.H.F.

The Classification of Animals, by **W. T. Calman.** Pp. vii+54. Methuen & Co. Ltd., 4/6.

This useful addition to the publisher's series of monographs on biological subjects consists of a concise introduction to the aims and methods of zoological taxonomy. It outlines the significance of classification in relation to wider biological studies and discusses the taxonomic aspect of the species question and problems relating to the evaluation of systematic characters. The main principles observed in the modern code of nomenclature are explained and guidance given on drawing up descriptions and diagnoses of species, the preparation of keys and illustrations, the use of measurements, citation of synonymy and references to literature. This brief and lucid summary of a branch of zoology to which little attention is given except by systematists, might profitably be studied by zoology students in general, whilst authors of new species in particular would do well to read and observe its instructions.

An Introduction to Botany, by **J. H. Priestley and Lorna I. Scott.** 2nd Edn. Pp. 625 with 170 text figures. Longmans, Green & Co., 21/-.

This text-book was first published in 1938 and soon earned a high and well-deserved reputation. It successfully achieved the difficult task of bringing originality of treatment and freshness of outlook to a first-year course in botany. For several years the book has been unobtainable and its reappearance will be welcomed by school and university teachers. The opportunity afforded by the preparation of a second edition has been used to introduce some modifications and additions. The unorthodox nomenclature applied to some vascular tissues in the first edition has been replaced by the more traditional terminology, while the

account of respiration mechanisms has been amplified and modernised and alterations made in other physiological sections so as to bring them into line with current views. In other respects, apart from the inevitable increase in price, the book remains practically unchanged.

Geology and Scenery of the Countryside round Leeds and Bradford, by **H. C. Versey.** Pp. x + 94 with a frontispiece and 19 figures. Thomas Murby & Co., 40 Museum Street, W.C.1. 10/-.

The district covered by this book is roughly bounded by the valleys of the Nidd and Calder. Dr. Versey describes with a minimum of technicalities the geological characteristics of the main sequence of rocks in this area—the Carboniferous limestone, Millstone Grit, Coal Measures and Magnesian limestone—and how their distinctive scenery may be interpreted in terms of their responses to the moulding forces of time. In an abbreviated form the book does for the area described what Kendall and Wroots' *Geology of Yorkshire* did for the county as a whole. Like that book its value is increased by the inclusion of descriptions of a series of field excursions with directions as to route and the principal features of geological interest to be observed. Dr. Versey has contrived to outline the main geological history of the area in such a way that intelligent countrygoers without geological training may add understanding to appreciation of the familiar landscapes around them. This is a book which Yorkshire naturalists in general and West Riding ones in particular would be well advised to acquire.—W.A.S.

Adventurers Fen, by **E. A. R. Ennion.** Pp. 109, with endpaper plans of the fen and numerous drawings by the author. Herbert Jenkins, Ltd., 10/6.

Those readers who have not already on their shelves a copy of the first edition have an opportunity of filling the gap with this fuller second edition, which describes the surrounding villages and the fenland industries. Dr. Ennion is probably best known for his distinctive drawings but during a busy life as Warden of the Field Study Centre at Flatford Mill he becomes the personal friend of students who flock to that delightful spot to learn from him, and at first-hand, some of Nature's secrets. To a Yorkshire dalesman the flat land of East Anglia may make little appeal, but there is an extraordinary fascination about its wide skies, and here is a book by an author who not only loves the marshes, and the birds and beasts which haunt the dykes and reed-beds, but is able by means of his pen and pencil to transfer his feelings to the pages of his book. This is the story of the fight between man and nature ending with reclamation complete and one more sanctuary lost, probably for ever. 'Adventurers Fen in all its loveliness has gone, but nature goes on elsewhere.' R. M. G.

Photograms of the Year, 1950. The Annual Review of the World's Photographic Art, with 4 mounted plates, 64 art plates plus 20 pages introduction. Published for 'Amateur Photographer' by Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1. 7/6 paper covers. 10/- cloth.

The present edition of *Photograms of the Year* presents a selection of the world's photographic art, the plates containing 79 reproductions of outstanding recently exhibited pictures specially selected out of thousands of entries. They are the work of photographers from all over the world and cover a wide variety of subjects. An introduction by Charles Wormald reviews the year's work in photography in Great Britain and overseas and Bertram Sinkinson contributes a critical commentary on the items selected for reproduction. These are all superb examples of the photographer's art which will have universal appeal both on technical and aesthetic grounds. They are pictures which in Mr. Sinkinson's words : 'have the power to command sustained attention and give to the beholder an inward sense of satisfaction and exhilaration.' For such a beautiful collection the price of the volume is very cheap.

The Story of Whitby Museum, by **H. B. Browne.** Pp. 144 with 9 plates and 41 other illustrations. A. Brown & Sons, Ltd., 10/6.

This handsomely-printed and well-illustrated account of the Whitby Museum is abridged from those portions of the author's earlier *Chapters of Whitby History,* 1823—1946, which deal with the town's Literary and Philosophical Society and the Society's Museum. The Society was founded one hundred and twenty-six years ago in the year following the formation of similar Societies at York and Hull and four years after the foundation at Leeds of the first Society of its kind in

the county. Formed with the intention of establishing a Museum for the cultural benefit of the town, it still retains control of and continues actively to fulfil its original purpose when all other Museums in the county except the Yorkshire Museum have passed under municipal administration. The account gives a full and interesting account of the vicissitudes through which the Museum has passed with biographical sketches of the officers and other personalities who have been associated with it and a survey of the nature and wide range of interest of the materials both of local and wider interest which it has accumatuled.

Under the title *British Flowering Plants and Modern Systematic Methods*, the Botanical Society of the British Isles has issued a Report of the very successful two-day conference on ' The Study of Critical British Groups ' held in London in April, 1948. The Report includes the papers read at the conference and accounts of the exhibits displayed at the Exhibition Meetings. The papers deal with ' Cytology and critical groups,' by Dr. E. F. Warburg ; ' Experimental studies on British species,' by Dr. W. B. Turrill ; ' Ecology and critical groups,' by Prof. A. R. Clapham ; ' Intraspecific categories of Variation,' by A. J. Wilmott ; ' Some problems of Water Buttercups,' by Dr. R. W. Butcher ; ' Vegetative and cytological variation in *Viola Riviniana*,' by Dr. D. H. Valentine ; ' Chromosomes and classification in *Rosa*,' by Dr. Kathleen B. Blackburn ; ' An introduction to the study of *Rubus*,' by W. C. R. Watson ; ' Forms of *Valeriana officinalis L*,' by Dr. T. A. Sprague, and ' Taxonomic problems in *Galium* and *Juncus*,' by Prof. A. R. Clapham. Apart from the individual interest of these papers they collectively reflect the modern synthetic approach to taxonomy through the co-ordination of field and herbarium studies with cytological, genetical and ecological work. They indicate also the revival of interest in systematics on the part of academic botanists who played so prominent a part in the conference. The report (pp. 102 with 18 plates, price 10/-) is edited for the Botanical Society of the British Isles by A. J. Wilmott and is obtainable from the Hon. Secretary of the Society, British Museum (Natural History), Cromwell Road, London, S.W.7.

The current volume of the *Scientific Journal of the Royal College of Science* (vol. 19, pp. 164) contains a selection of papers read before the Imperial College Chemical Society, the Royal College of Science Mathematical and Physical Society, and the Royal College of Science Natural History Society. From the large number of lectures delivered in the course of the 1948-1949 Session, eleven have been selected for publication together with a biography of the late Professor Sir Ian Heilbron. The papers include ' Some recent research on phosphorous compounds,' by Dr. B. Raistrick ; ' Electrochemical research in the R.C.S.,' by Dr. R. Parsons ; ' How " chemically inert " substitutes may influence the action of drugs,' by Prof. A. Albert, and ' Vitamin A research in the R.C.S.,' by Dr. F. Sondheimer. The two biological papers are a student lecture on ' Spiders,' by D. A. Priest, and one on ' Slugs and Snails,' by Dr. L. B. Langmead. Other papers are on ' A scientific approach to European witchcraft,' by Dr. R. E. Rewell ; ' A symposium on visual research at Imperial College,' by Drs. W. P. Wright, Mary P. Lord and L. C. Thompson ; ' The impact of modern physics on Christian faith,' by Dr. A. Wood ; ' The paths of electron tracks in photographic emulsions,' by Dr. R. H. Hertz, and ' Non-Euclidian geometry and scientific thought,' by L. Roth. The journal is obtainable from The Sales Manager, Scientific Journal, Royal College of Science, London, S.W.7, and costs 10/-.

We have received from the Ordnance Survey Office, Dublin, copies of two newly-prepared maps for use in recording biological distributions in Ireland. The larger map (scale 10 miles to 1 inch, approximate size 40 × 29 inches) is sold at 4/- per copy, paper flat, 4/6 folded and covered. This shows the recognised divisions into sub-provinces, counties and vice-counties in colour with appropriate key-numbers and letter symbols. The smaller map (scale 50 miles to 1 inch, approximate size 8 × 6 inches) shows the country and larger lakes and islands in outline only with the county and vice-county boundaries, letter symbols and key numbers. This is sold at 3d. per copy and is particularly well suited for marking up distributional data. The maps are obtainable direct from the Ordnance Survey of Ireland, Phoenix Park, Dublin, or through its agents or any bookseller.

APRIL-JUNE, 1950 No. 833

The NATURALIST

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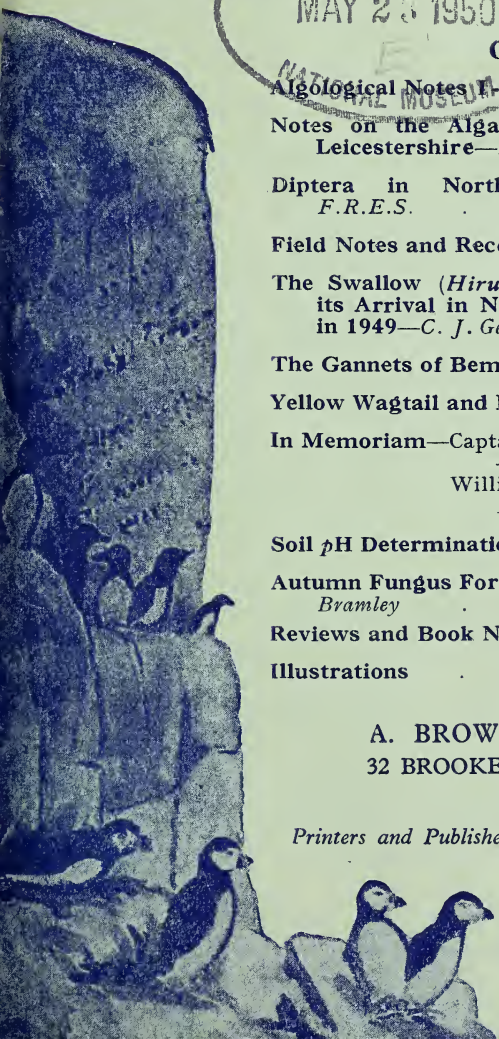

Contents

	PAGE
Algological Notes I-III—*J. W. G. Lund*	45-49
Notes on the Algae of Swithland Reservoir, Leicestershire—*Nial Reynolds and F. J. Taylor*	49-55
Diptera in Northumberland—*L. Parmenter, F.R.E.S.*	56-59
Field Notes and Records	59-60
The Swallow (*Hirundo rustica rustica* L.) and its Arrival in Northumberland and Durham in 1949—*C. J. Gent*	61-62
The Gannets of Bempton—*A. J. Wallis*	63-64
Yellow Wagtail and Redstart—*Ralph Chislett*	64-66
In Memoriam—Captain S. E. Evans, M.B.E., M.A.—*E. W. Taylor*	67-68
William Bunting Crump, M.A.—*F. Beckwith and W. A. Sledge*	68-70
Soil *p*H Determinations	71-72
Autumn Fungus Foray at Austwick, 1949—*W. G. Bramley*	73-76
Reviews and Book Notices	77-80
Illustrations	45, 47, 48, 50, 51, 67, 69, 72

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APPLY TO
The Editor of the Naturalist, The University, Leeds, 2

ALGOLOGICAL NOTES I-III

I. *Pleurocapsa minor* Hansg. em. Geitler.
II. *Mallomonas reginae* Teiling.
III. *Chlamydomonas proboscigera* Korschikoff.

By J. W. G. Lund

Freshwater Biological Association, Ambleside.

I. *Pleurocapsa minor* (Hansg.) Geitler. Fig. 1.

In the present material, the cells (3-10μ along the longest axis) are dark blue-green to yellowish (unhealthy?) in colour. They have homogeneous, minutely granular contents. Their shape varies considerably in relation to the type of growth produced and the division-rate. The commonest stage consists of masses of cells in packets of two to four (fig. 1A). This *Chroococcus*-stage is often developed in *Pleurocapsa* spp. Almost as frequent are the simple filamentous stages (fig. 1C). All gradations between these two stages occur (fig. 1B,C). The filaments are short and narrowed from the base to the apex. Though many are unbranched,

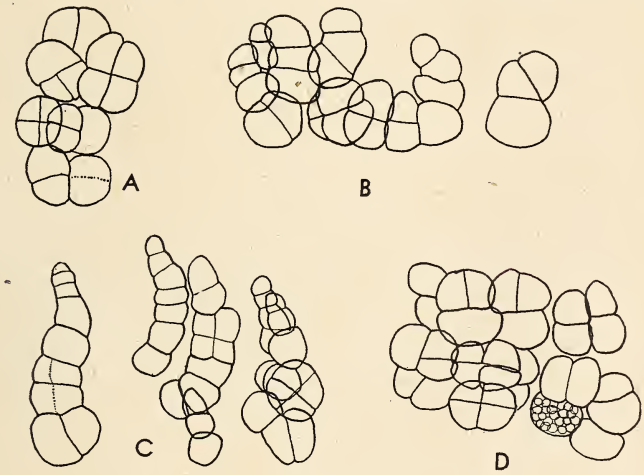

Fig. 1.

Pleurocapsa minor (Hansg.) Geitler. *A*, *Chroococcus*-stage; *B*, transition to *C*, filamentous stage; *D*, as *A*, cell with endospores. All x 750.

branching is frequent by means of a lateral outgrowth of an intercalary cell. Separation of such branches, however, soon occurs, the basal cell becoming more or less hemispherical. Separation always occurs before the lateral has itself produced a branch. Sometimes, the branches come to lie parallel to the parent filament. In addition, the cells of the threads may undergo oblique or longitudinal divisions leading to pseudoparenchymatous growths or reverting to the *Chroococcus*-stage (fig. 1C). Endospores, ten or more in number and about 2μ diam. may be formed in any cell apart from those near the apex of the filaments. Geitler (1925, p.346) has described how culture on agar causes a great outburst of endospore formation in old strata. I have observed a similar though less marked effect on the addition of culture solution, but most of the endospores so produced turned a greenish-yellow colour and may not have been viable.

The present alga undoubtedly belongs to *Pleurocapsa minor* (incl. *P. concharum* Hansg.) as described and figured by Geitler (1925, pp. 343-47, fig. L). He describes the simple or branched filaments as the *status reptans* and the pseudoparenchymatous filaments as the *status frondescens*. His *status adultus* and *status mucosus* never occurred in the present material. Their absence may be due to the

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unusual habitat (see below). In the former stage, compact pseudoparenchymatous growths are formed ; they consist of tightly packed upright, branched or unbranched filaments, whose cells are usually polygonal as a result of the mutual pressure. In the latter stage, the cell membranes become mucilaginous.

Like many Myxophyceae, *P. minor* is polymorphic but it is also probable (Geitler 1932, p. 351) that, as at present described, it is an aggregate species. Thus Geitler (1932) includes, as a synonym, *Chroococcopsis fluminensis* Fritsch (1929) which is recorded from fast flowing Devonshire streams. Geitler is probably correct in placing Fritsch's alga in this genus as it appears to be filamentous. However, though it was of common occurrence, Fritsch did not observe the typical endospores so often seen in *P. minor*. Indeed it seems probable that his alga propagates by means of large endospores produced singly within the cells (Fritsch 1929, p.184, fig. 7, L). Moreover, the strata correspond only to the *status adultus* of *P. minor*, where the filamentous structure is more or less obscured and are, hence, unlike the growths here described. For the present, quite apart from the difference in habitat, I do not consider the evidence justifies the inclusion of *Chroococcopsis fluminensis* in *Pleurocapsa minor*.

Samples containing rich growths of *P. minor* were sent to me by Dr. T. G. Tomlinson. He informs me that it occurs on the pebbles of sewage beds in the neighbourhood of Birmingham. Often the growths are so vast that they give the beds a characteristic sooty appearance. The evil-smelling material was rich in bacteria and other common algae included a species of *Chlorella* and *Hantzschia amphioxys* (Ehr.) Grun. *P. minor* has not been recorded previously in a comparable habitat though Geitler (1925, 1932) states it occurs in standing as well as very frequently in flowing water, on stones or the shells of molluscs.

II. *Mallomonas reginae* Teiling. Fig. 2.

The cells (25-60μ l., 10-13μ br.) of the English specimens vary from oval, ellipsoid to elongate oblong (fig. 2, F-K). There is an apical crown of 4-8 scales (approx. 6μ l.) which are roughly triangular in outline, while the protoplast is covered by oval scales (6-6.5μ l. ; 3-4μ br.) arranged in transverse series. The apical scales bear a faint more or less polygonal meshwork of markings (fig. 2E). Owing to the difficulty of resolving them I am not certain as to the extent to which they cover the scale nor whether they are always present. The body scales (fig. 2, N-S), as those covering the protoplast may be called, are shaped like two U's, the upper inverted and fitting into the lower. The spines arise from the middle of an ellipsoid area in the upper portion of the scale, while, near the base, this part of the scale is ornamented. The ornamentation consists of a transverse band of angular, more or less polygonal markings which are similar to but more easily resolved than those of the apical scales. The spines (36-49μ l.) are bent just above the point of insertion (fig. 2Q, R). They are not otherwise curved and are smooth. Their apex is bluntly pointed (fig. 2, L, M.).

The flagellum is as long as or somewhat shorter than the cell. There appear to be two chromatophores more or less overlapping one another but it may well be that, in some cells at least, there is only one with a longitudinal slit in it. No cysts have been seen though populations have often been observed since 1945.

The present description differs from the original one of Teiling (1944, 1946, p 89, figs. 9-11) in that he states that the body scales bear a transversely arranged series of rounded markings (punctae), not a polygonal meshwork. The difference, in my view, is one of interpretation, perhaps related to the fact that Teiling has examined dried material while I have mounted the scales in various media used for the examination of diatoms. Dr. Teiling has kindly sent me material from Sweden which is identical with that here described and, in my view, also has the same scale markings. I have also sent him some of the specimens on which this account is based and he has confirmed their identity with *M. reginae*.

M. elegans Lemm. var *pulchella* Kisselew (1931) should be included in *M. reginae*, agreeing in the crown of triangular scales and the structure and arrangement of the body scales and spines. He also interprets the markings on the body scales as reticulate meshwork (Kisselew 1931, p 239, fig. 3F), though the meshes are more symmetrical than in the British specimens. His statement that the spines are 18μ l. is contradicted by his figures 3a, b, which show them about twice that length. Conrad (1933, p 75) rightly states that Kisselew's species cannot belong to *M. elegans* Lemm. but shows close similarity with *M. coronata* Bolochonzew

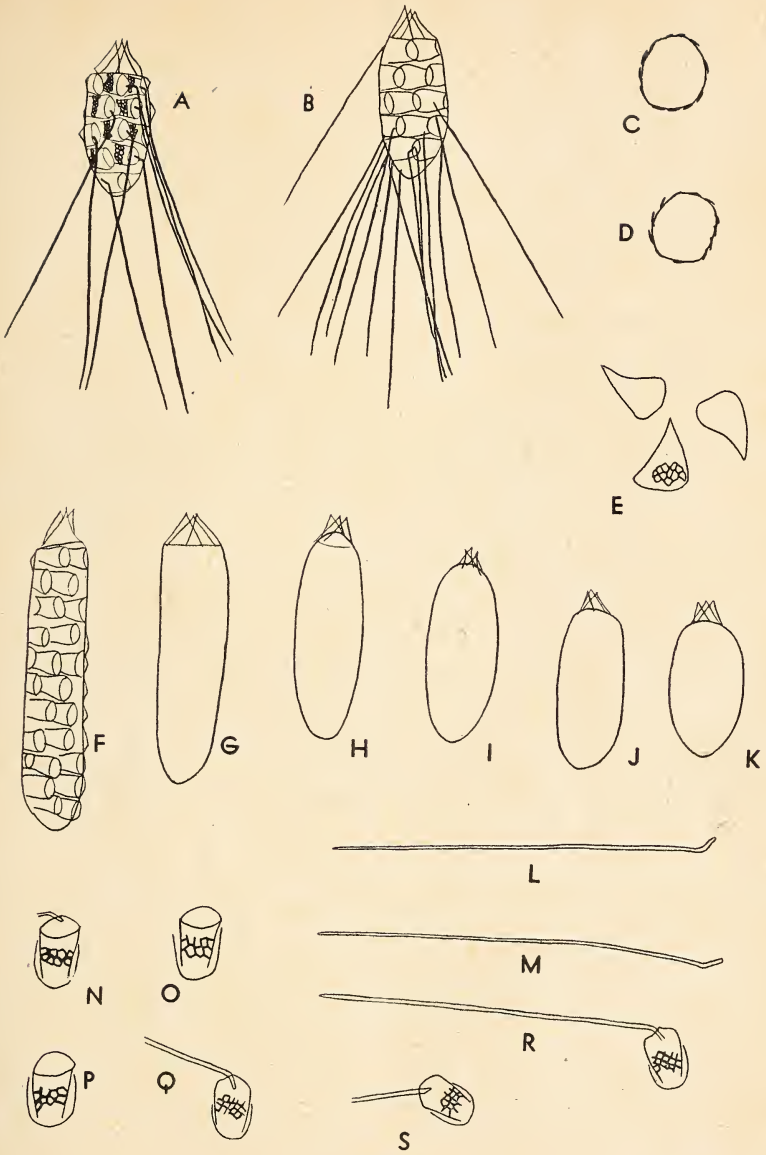

Fig. 2.

Mallomonas reginae Teiling. *A*, *B*, surface view of cell, showing arrangement of scales and spines ; *C*, *D*, optical transverse section ; *E*, apical scales, some ornamentation shown on one ; *F-K*, cells of diverse size and shape ; *L*, *M*, spines ; *N-S*, body scales, some showing a part or all of the attached spine. Some spines missing in *A* and *B*. *A-D*, *F-K* × 750 ; *E* × 1600 ; *L-S* × 1250.

(1903). The latter differs from *M. reginae* in the papillate body scales whose surface is almost wholly ornamented (see Teiling 1946, pp 84-5 and fig. 8). It cannot be over emphasised that correct determination of most species of *Mallomonas* can only be made by an examination of the scales and spines using the best optical apparatus and mountants. It is curious that, despite the numerous investigations of phytoplankton in Sweden and the English Lake district, this alga has so recently been recorded in so many lakes (c.f. Teiling 1946, p. 85).

M. reginae occurs commonly but not in abundance in the plankton of the following lakes in the English Lake District : Windermere, Esthwaite Water, Crummock Water, Loweswater, Haweswater and Blelham Tarn. It is most abundant in the last named, occurring mainly in the summer months.

III. *Chlamydomonas proboscigera* Korschikoff. Fig. 3.

The cells (12-17μ l; 9-15μ br.) of the British specimens are oval to widely

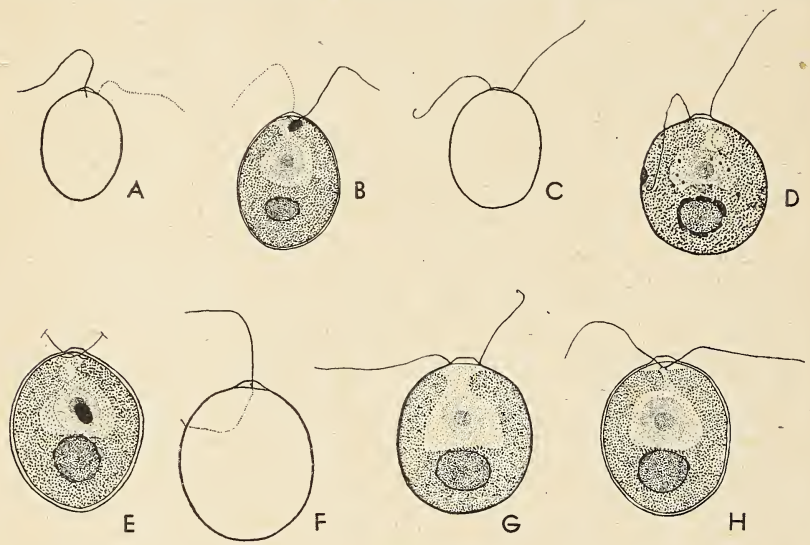

Fig. 3.

Chlamydomonas proboscigera Korschikoff. *A*, *C*, *F*, stained in methylene blue, the rest fixed in 1% osmic acid. All × 1125.

elliptical when young (fig. 3, A-C). With increasing size comes an increasing rotundity so that the largest cells are sub-spherical (fig. 3 D-H). The flagella are approximately the length of the cell. The papilla is delicate and not always detectable in unstained cells. In the plane in which the flagella are inserted (flagella-plane) the papilla is transversely truncate with sloping ends ; it is often very slightly raised above the cell surface (fig. 3 C-E, G, H). In the opposing plane it is rounded truncate to bluntly pointed and is usually less prominent (fig. 3A, B, F). There are two anterior contractile vacuoles. The stigma forms a bi-convex lens with the inner convexity greater than the outer ; the pigment is mainly located against the inner margin. It lies close to the cell surface, generally medianly placed, sometimes anterior but never basal. It is usually oriented so that it is seen in side-view when the cell lies with the flagella plane facing the observer (fig. 3D). This orientation appears to be the opposite of that in Korschikoff's specimens (Pascher 1927, fig. 161a). The basin-shaped chromatophore has a massive basal thickening whose upper edge is usually at right-angles to the long axis of the cell (c.f. Gerloff 1940). The large oval to sub-spherical pyrenoid (rarely two pyrenoids) lies in this thickening, while the nucleus is in the space above.

Only asexual reproduction (2 to 4 swarmers) was observed.

The present specimens, though smaller than those recorded in Pascher (1927), agree very closely with those obtained from soil by Gerloff (1940, figs. 38, 39). The range of variability in his culture media and in relation to the age of the cells was no larger than in the present natural population. He describes the papilla as prismatic and sometimes there was a slight central depression. *C. britannica* Lund (1947) comes so near to this species that further study may lead to its inclusion in it. The most striking difference lies in the absence of the prominent stigma of *C. proboscigera*. The papilla of *C. britannica* is more prominent, truncate but not emarginate in the plane of the flagella and pointed in the opposing plane.

This species occurred in great abundance in a horse trough near Low Wray, Lancashire in September 1949 ; *Scenedesmus* spp. and *Botrydiopsis anglica* Fritsch and John were also abundant.

These three algae are new records for Great Britain.

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NOTES ON THE ALGAE OF SWITHLAND RESERVOIR, LEICESTERSHIRE

NIAL REYNOLDS AND F. J. TAYLOR

Botany Department, University College, Leicester.

The collections on which these notes are based were made in 1938-39 (N.R.) and 1946 (F.J.T.). The latter collections were intended as part of an investigation of the periodicity of the diatoms of the Reservoir and were accompanied by a series of chemical analyses. As very little information is at present available on the algal ecology of lowland lakes, it seemed desirable to publish this short survey.

Swithland Reservoir lies about seven miles north of Leicester, and is one of the reservoirs which have been built to supply water to that city. It is a pleasant stretch of water being over a mile long and one-third of a mile wide at its widest part. As is common with such reservoirs, it was constructed by damming a shallow valley. At the centre of the dam the water is 26 ft. deep when full, and then the reservoir contains 541 million gallons. Since the valley in which it was built is very shallow, the depth of water is often less than 10 ft., even at considerable distances from the bank. As is usual with drinking reservoirs, the upper part is cut off as a settling pond, the division being effected by an island and two weirs, the tops of which are one foot below the surface. The shores are composed mainly of reed-swamp vegetation with floating *Polygonum amphibium* further out.

Two feeding streams flow into the Reservoir, one of which is the overflow from Cropstone Reservoir, which lies about one-and-a-half miles further up the valley,

and the other is a small stream about two miles long. The Reservoir is entirely supplied by surface drainage, which comes from a region composed of red marl, overlain in the higher parts by boulder clay. The region was fairly well wooded until extensive tree-felling started in 1945. When full the water level is 190 ft. above sea level, and the feeding streams arise at 250-300 ft. above sea level.

The material was collected by towing a fine bolting-silk net behind a rowing boat at the rate of about two miles per hour. As a rule two or three collections were made on each occasion, care being taken to avoid the edges in the hope of collecting only planktonic algae. However, as can be seen from the species list, a number of non-planktonic algae were collected. Some of these no doubt originated from the bottom deposits, and were distributed in the upper layers by wave action during rough weather. Collections were made either weekly or fortnightly.

The 1938-39 material was counted by counting the numbers of organisms in a number of fields of a suspension of the plankton spread on a microscope slide. The 1946 material was counted by sedimenting a known volume of water with

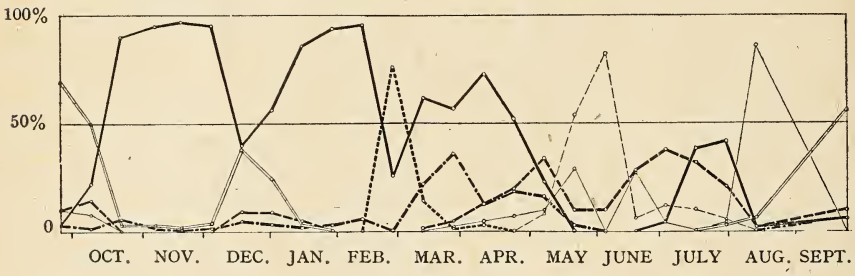

Fig. 1.
Frequency of the Occurrence of the more important plankton Algae in Swithland Reservoir, Sept., 1938—Sept., 1939, expressed as a Percentage of the Total Plankton on each Occasion.

iodine and counting the organisms with an inverted microscope. The plankton was also examined for any organism which did not occur in the counts.

Periodicity.

As these observations were carried out over periods of one year, it is possible to make a general statement of the periodicity of the algae. The main algae are included in Figs. 1 and 2, and notes on the periodicity of the subsidiary algae are included in the species list. As is usual in silted lakes, the plankton is dominated by diatoms.

The winter plankton (Nov.-Feb.) is very sparse, consisting in the main of *Asterionella formosa* and *Cyclotella compta*, with frequent individuals of *Closterium aciculare*. Towards the end of February the diatoms begin to increase in numbers. In 1939, *Stephanodiscus hantzschii* appeared in enormous numbers at the end of February and then died down. The corresponding increase in 1946 was of *Synedra acus*. This was followed by a maximum of *Asterionella*, which was followed by a maximum of *Fragilaria crotonensis*, which was much more important in 1946, when the maximum lasted from the middle of June to the end of August. After a small autumnal maximum of *Asterionella*, the plankton again reverted to the winter condition of low numbers.

As subsidiary species, members of the Chlorophyceae were common, especially in the summer. However, although many different species were present, only *Eudorina* in 1939 and *Pandorina* in 1946 attained any importance, the other species being of only local importance. Apart from *Closterium aciculare* in the winter, the desmids were of very limited occurrence. *Staurastrum paradoxum* showed interesting variations between the typical form and individuals with two arms per semi-cell, and these have been discussed by Reynolds (1940).

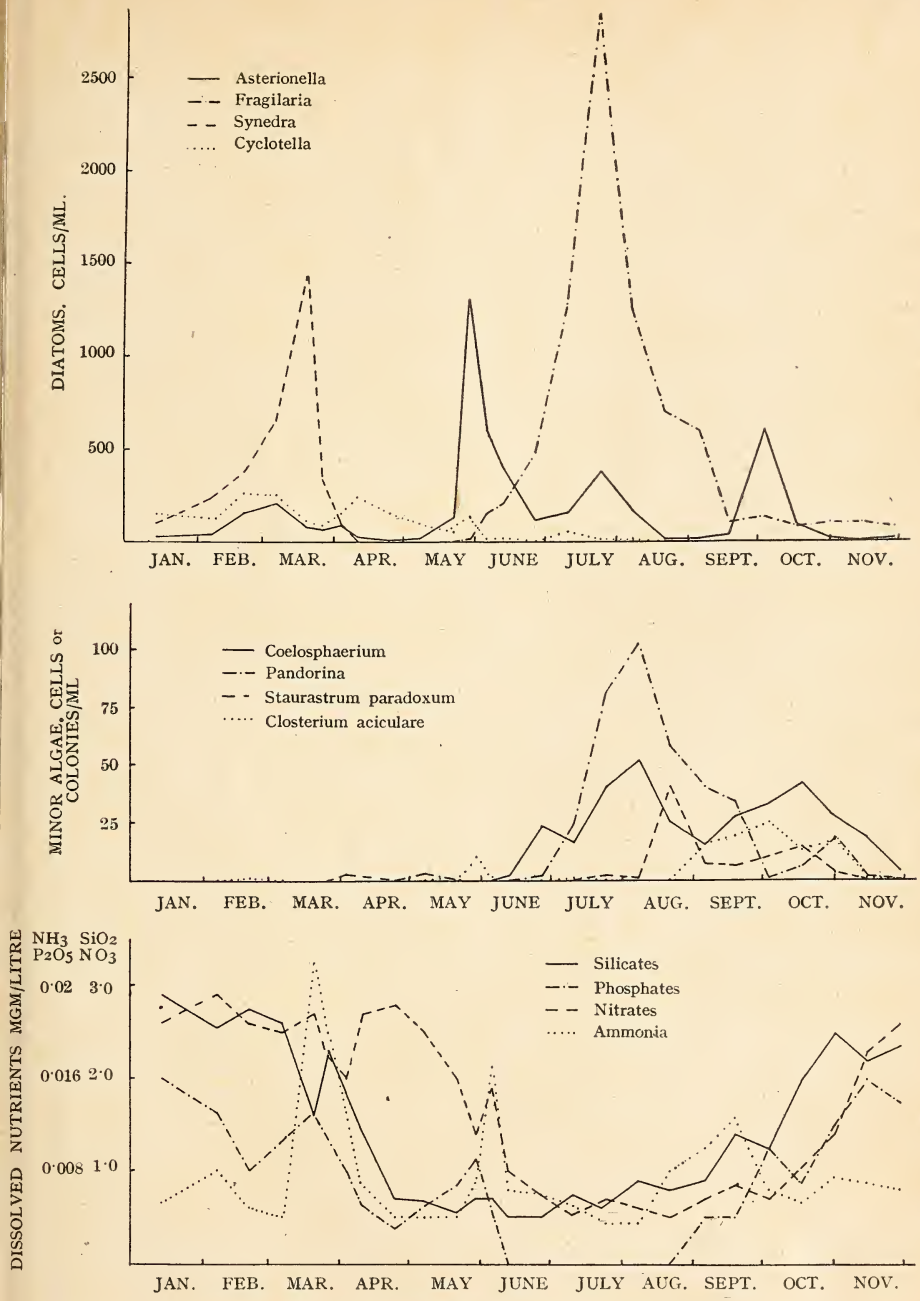

Fig. 2

Periodicity of the more important plankton Algae of Swithland Reservoir in 1946, with the Variations in the Concentrations of some important Mineral Nutrients.

The Cyanophyceae were of very limited importance because they were destroyed by frequent applications of copper sulphate. The effect of copper sulphate on the diatoms was usually slight, with low concentrations (1 part by weight of copper sulphate to 10 million parts of water). A typical effect on *Anabaena* was noted in June, 1946, when dosage with copper sulphate took place on June 7th. A comparison of the plankton samples taken on June 6th and 8th, showed that before the addition of the copper sulphate, a considerable number of *Anabaena* filaments were present, and no copper could be detected in the water. A few filaments were found on June 8th, when the copper sulphate concentration was 0.0063 mg./lit., but all the *Anabaena* filaments had disappeared by June 13th, when no copper could be detected in the water. One of the after-effects of the sulphating was that small Chlorophyceae increased in numbers.

As a result of fortnightly dosages with copper sulphate, the blue-greens were never allowed to form a water-bloom in 1946, although *Coelosphaerium* reached concentrations of up to 70 colonies per ml. in August. In 1939, however, *Anabaena spiroides* formed a thick scum on the surface of the water before being removed with copper sulphate. The only other blue-green which was present in sufficient numbers to appear in the counts occasionally was *Microcystis flos-aqueae*.

An interesting feature is the virtual absence of *Ceratium hirundinella* which forms maxima in several lakes. Lind (1944) has suggested that the unimportance of this species in some of the meres of the Cheshire plain is due to the lack of peaty material in the water, but *Ceratium* is absent in Oakmere, the peatiest lake investigated. Pearsall (1924) has considered this species to be characteristic of lakes intermediate between the rocky and silted types.

Chemical Changes in the Water.

Since the Reservoir is shallow, there is no opportunity for stratification to set in during the summer. Dissolved oxgen measurements showed that the bottom layers were still fully oxygenated during the summer, and the bottom temperature varied only slightly from the surface temperature. A few comparative analyses of bottom and surface water were made, but they did not differ significantly, so that surface samples only were used. The variation in 1946 is shown in Fig. 2.

The water is hard, the hardness varying from 80 mgm/l. calcium carbonate in the winter to 110 mgm/l. in the late summer. There is a gradual increase in the hardness during the summer, which is followed by a decrease in the winter. This hardness of the water is surprising since most of the drainage area is red marl, but it is probable that the boulder clay contains an appreciable amount of chalk in it.

Silicates are fairly high in the winter (up to 3 mgm/l.) but fall with the early increases of the diatoms. The concentration then remains steady at 0.5-0.7 mgm/l. during the summer. Even so, quite considerable growths of diatoms are possible in spite of the low silicate concentration.

Nitrates remain high during most of the year, but ammonia reaches its highest concentrations after an algal maximum, suggesting that most of this comes from decomposition of the dead algae. Phosphates disappear during the spring, and do not reappear until autumn.

Discussion.

On the whole, the water is typical of lowland waters, and the fairly high concentrations of minerals is a feature usually associated with heavily silted lowland lakes surrounded by cultivated land. The periodicity of the algae follows the type that has previously been described for European waters. The main difference from the previously described periodicities for eutrophic lakes is the absence of any large blue-green phase. This may be accounted for in part by the copper sulphating of the water, but it is possible that other factors are at work. Thus the plankton of Saddington Reservoir to the south of Leicester, which does not receive copper sulphate, was not found to have a marked blue-green phase during the summers of 1947 and 1949. The composition of the plankton differs from the Cheshire meres (Lind 1944) which are the only lowland lakes for which comparable data are available, in the greater abundance of diatoms, which are dominant for most of the year. These meres, however, show a much greater dominance of Cyanophyceae during the summer.

It is more interesting, however, to compare the data for Swithland Reservoir with those for the reservoirs of the Metropolitan Water Board. In these reservoirs

there is usually an abundance of diatoms followed by a blue-green phase in the summer. The most important diatoms are *Asterionella, Cyclotella* and *Fragilaria crotonensis* which give high concentrations in spring. In Queen Mary Reservoir *Fragilaria crotonensis* was especially abundant and the maximum was maintained for a considerable period of time in 1936 and 1937 (M.W.B., 1938). Continuous dosage of copper sulphate did not apparently affect the increase of this organism, an observation which is confirmed in Swithland Reservoir. Hutchinson (1944) has noted that the conditions for the rise of *Fragilaria crotonensis* appear to be identical with those determining the rise of *Anabaena* and suggested that the relative numbers of these two species may be due to competition for phosphate favouring *Fragilaria* when nitrate is abundant and *Anabaena* when nitrogen is scarce. This conclusion appears to be borne out by the observations for Swithland Reservoir.

SUMMARY.

An account is given of the periodicity of the algae of Swithland Reservoir, Leicestershire, and it is shown that the diatoms are the most important group of algae, *Asterionella formosa* and *Fragilaria crotonensis* forming large maxima. The Cyanophyceae are relatively unimportant, partly due to discouragement by the application of copper sulphate, and partly to the relatively large concentrations of nitrate in the summer which appears to encourage growth of *Fragilaria crotonensis* rather than *Anabaena*.

ACKNOWLEDGEMENTS.

Our thanks are due to Mr. T. S. Griffin, of the Leicester Water Works, for permission to take samples from Swithland Reservoir, and to the Superintendent, Mr. C. G. Crowther, for kind help. We must also thank Mr. E. K. Horwood and Mr. H. M. Hurst for assistance in sampling.

List of Species Observed

The arrangement of the species follows Fritsch & West (1927) supplemented by reference to Pascher's *Süsswasserflora*. The species asterisked have not previously been recorded for Leicestershire.

CHLOROPHYCEAE

VOLVOCALES

Chlamydomonas sp. A few individuals were occasionally observed.

Gonium pectorale Müll. One individual only seen in June, 1946.

Pandorina morum Bory. A few individuals usually present in the summer.

Eudorina elegans Ehrenb. Common in the summer. Several specimens were parasitised by chytrids. Ingold (1940) has described *Endocoenobium eudorinae* from this reservoir, and also found *Dangeardia mamillata* parasitising *Eudorina*.

Sphaerella lacustris (Girod.) Wittr. Occasionally encountered, usually very darkly coloured with haematochrome.

Volvox aureus Ehrenb. Present in late summer and autumn.

V. globator (L.) Ehrenb. Present with *V. aureus*. Zoospores observed in August.

Sphaerocystis schroeteri Chod. Fairly common in the summer.

Asterococcus superbus (Cienk.) Scherf. Rare.

**Gemellicystis neglecta* Teiling. Some colonial green forms which occurred in the summer were referred to this species, recently described from Sweden, by Dr. J. W. G. Lund, who has recently found the alga in the Lake District.

**Tetraspora lacustris* Lemm. Occasionally in late summer.

CHLOROCOCCALES.

Characium naegelii A.Br. Frequent, attached to rotifers.

Pediastrum duplex Meyen. Present with *P. boryanum*, but not so common.

**P. glanduliferum* Benn. Found on two occasions in February, 1946.

P. boryanum (Turp.) Menegh. Present in most samples. Forms fitting into several described varieties were observed, but there appeared to be several intergrading forms.

P. tetras (Ehrenb.) Ralfs. Found on several occasions.

**Oocystis elliptica* W. West, f. *minor* W. West. This agrees with the description in the *Süsswasserflora*, there usually being four cells per colony. Common during the summer. Type recorded for Leicestershire.

**Tetraedron muticum* (A.Br.) Hansg. A few individuals noted in 1939, but not in 1946. Type not recorded for Leicestershire.

Ankistrodesmus falcatus (Corda) Ralfs. Frequent in the summer, specimens of the vars *acicularis* (A.Br.) G. S. West and *mirabilis* W. and G. S. West being present.

**A. lacustris* (Chod.) Osten. Rare in the summer.

**Kirchneriella obesa* (West) Schmidle. Frequent in the summer.

**Actinastrum hantzschii* Lagerh. Two typical colonies were observed in February, 1946. This is frequently a river alga, and only rarely occurs in lakes, though it has been recorded from a pool near Newcastle (Griffiths, 1923) as well as from lakes in Wisconsin, U.S.A.

Dictyosphaerium pulchellum Wood. A frequent constituent of the summer plankton.

**Crucigenia rectangularis* (Naeg.) Gay. Rare, in June, 1946.

Scenedesmus quadricauda (Turp.) Bréb. Present all the year round in low numbers. 8-celled coenobia were frequent.

Coelastrum microporum Naeg. Common all the year in 1946.

**C. reticulatum* (Dang.) Senn. Only observed in 1939.

C. sphaericum Naeg. Only observed in 1939.

ULOTRICALES

Ulothrix tenerrima Kütz. Some short filaments were found during the spring.

CONJUGALES

Mougeotia sp. Filaments of this were frequent in the plankton.

Closterium aciculare West. Common during the winter.

Cosmarium botrytis (Bory) Menegh. Occasional in the summer.

Staurastrum gracile Ralfs. Of rather infrequent occurrence, but commonest during the summer.

**S. paradoxum* Meyen. Common during the summer. Forms with only two arms on each semi-cell, and forms with one semi-cell bearing two arms, and the other three arms were frequent (see Reynolds, 1940). Type not recorded.

XANTHOPHYCEAE

Botryococcus braunii Kütz. Occasional colonies found.

CHRYSOPHYCEAE

**Uroglena volvox* Ehrenb. One individual in November, 1946.

**U. americana* Calkins. A few individuals were observed in June, 1946. Since the colonies soon break up after collection, this alga may be more frequent than this record indicates.

**Dinobryon cylindricum* Imhof. Rare.

**D. divergens* Imhof. Frequent during later summer and the autumn.

BACILLARIALES

Melosira varians Ag. Present during the winter months only.

Cyclotella compta (Ehrenb.) Kütz. Common, especially during the spring, but never giving a large maximum.

**Stephanodiscus hantzschii* Grun. This was only observed during February and March, 1939. During this period it reached a large maximum, and then died out completely. This is typically a river alga.

Diatoma hiemale (Lyngb.) Heib. Rare during the winter.

Fragilaria capucina Desmaz. Rare in spring.

**F. crotonensis* (A. M. Edw.) Kitton. Reaches high maxima during the summer. Present all the year round. Type not recorded.

Synedra acus (Kütz.) Grun. Abundant in the spring.

S. acus var. *radians* (Kütz.) Hust. Present in many collections but never in large quantity.

Asterionella formosa Hass. Present all through the year, giving maxima in spring and autumn.

Navicula spp. Several species occurred from time to time. Of these the following have been identified :

**N. menisculus* Schum. During the winter.

**N. radiosa* Kütz. During the winter. Type not recorded.

Pinnularia viridis (Nitz.) Ehrenb. Frequent.
Stauroneis acuta W. Smith. In March only.
Gyrosigma attenuatum (Kütz.) Rabh. Infrequently throughout the year.
Gomphonema acuminatum Ehrenb. Occasionally found attached to pieces of debris.
Cymbella helvetica Kütz. Several individuals noted.
Amphora ovalis Kütz. Rare.
**Nitzschia sigma* (Kütz.) W. Smith. Occasional.
N. sigmoides (Ehrenb.) W. Smith. Occasional.
Nitzschia sp. Rare.
**Cymatopleura elliptica* (Bréb.) W. Smith. Occasional throughout the year. Type not recorded.
**C. solea* (Bréb.) W. Smith. Occasionally throughout the year. Type not recorded.
**Surirella capronii* Bréb. Rare, in February, 1946.
S. linearis W. Smith. Rare.
**S. robusta* Ehrenb. Rare. Type not recorded.
S. robusta var. *splendida* (Ehrenb.) v. Heurk. Occasional.
**Campylodiscus hibernicus* Ehrenb. November, 1946, only.

CRYPTOPHYCEAE

Cryptomonas sp. An organism resembling *C. ovata* Ehrenb. was common in the sedimentation counts, reaching a concentration of 100 cells per ml. in August.

DINOPHYCEAE

**Gymnodinium paradoxum* Schill. Rare, during the summer.
**Glenodinium cinctum* (Müll.) Ehrenb. Rare, during the summer.
Peridinium sp. Frequent in the summer.
**Ceratium hirundinella* O.F.M. Occasional during the year, but never reached such importance as it does in some lakes.

EUGLENINEAE

Euglena viridis Ehrenb. In May, 1946, only.
E. spirogyra Ehrenb. Frequent during the summer.

CYANOPHYCEAE

Merismopedia glauca (Ehrenb.) Naeg. Rare during the summer.
**Coelosphaerium naegelianum* Unger. Usually present, and reaching concentrations of up to 50 colonies per ml in late summer.
Microcystis flos-aquae (Wittr.) Kirchn. Occasional during the summer.
Oscillatoria limosa Ag. A few individuals found in the spring.
**Anabaena spiroides* Kleb. Formed a water-bloom in August, 1939. Not seen in 1946.
A. inaequalis (Kütz.) Born. and Flah. Frequent until killed off by copper sulphate. Recorded for Swithland Reservoir by Rich (1925).

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DIPTERA IN NORTHUMBERLAND

L. PARMENTER, F.R.E.S.

DURING the period autumn, 1942, to spring, 1943, I spent a few odd hours, mostly in April and May, 1943, collecting flies in Ewart Park, near Wooler, Northumberland, and in its immediate neighbourhood, whilst my battery was stationed there. No collecting was done on the Cheviots but merely in the woods and fields between the Park and Wooler. Comparing my notes with the late W. J. Fordham's fine list published in 1945, there appeared to be a number of species not mentioned by Fordham. These are listed below (marked *) and in addition I have added notes on species found on dates which extend the flight times given by Fordham. Unfortunately, in most cases, Fordham did not indicate whether the species occurred in Northumberland. I have therefore appended a list of the other species taken during the period in the county.

The nomenclature used is that of Kloet and Hincks unless otherwise stated, but I have added in square brackets the names mentioned by Fordham.

TIPULIDAE [including LIMONIIDAE]

**Erioptera griseipennis* Mg. May 17th.
Ormosia lineata (Macq.) April 19th.
Tipula luna West. May 17th.
T. lunata L. May 17th and 24th.
T. variipennis Mg. May 17th.

TRICHOCERIDAE

Trichocera regelationis (L.) March, April to May 12th.

BIBIONIDAE

**Bibio ferruginatus* (L.) May 12th.
B. varipes Mg. April 4th.
Dilophus femoratus (Mg.) May 24th.

STRATIOMYIDAE

**Beris fuscipes* Mg. May 17th.
Microchrysa polita (L.) May 24th.

ASILIDAE

Dioctria rufipes (Deg.) May 24th.

EMPIDIDAE

**Empis digramma* Mg. May 12th and 24th.
E. nuntia Mg. May 12th and 24th.
E. opaca Mg. May 12th.
E. tessellata Fab. May 23rd.
**Platypalpus minutus* (Mg.) May 24th.
Rhamphomyia nigripes (Fab.) May 24th. (*negripes* in Fordham, p. 221, is a misprint.)
**R. tarsata* Mg. May 12th and 24th. (det. J. E. Collin.)
Tachypeza nubila (Mg.) May 24th.

DOLICHOPODIDAE

**Campsicnemus loripes* (Hal.) May 2nd.
Dolichopus brevipennis Mg. May 24th.

PHORIDAE

**Megaselia meconicera* (Speiser) March 21st.
M. rufipes (Mg.) May 4th.
(Both species det. C. N. Colyer.)

DORILAIDAE [PIPUNCULIDAE]

Chalarus spurius (Fln.) May 2nd.
Dorilas [*Pipunculus*] *confusus* (Verr.) May 17th.

SYRPHIDAE

Chrysogaster hirtella Lw. May 24th.
Cinxia [*Sericomyia*] *lappona* (L.) May 24th.
Epistrophe [*Syrphus*] *eligans* (Harr.) [*bifasciata* (Fab.)] May 2nd.
Episyrphus [*Epistrophe—Syrphus*] *balteatus* (Deg.) Oct. 4th. Visiting dandelion and hogweed flowers.
Helophilus pendulus (L.) May 4th and 24th.
Metasyrphus [*Syrphus*] *consisto* (Harr.) [*corollae* (Fab.)) Sept. 26th. Visiting ragwort flowers.
M. luniger (Mg.) Sept. 26th. Visiting ragwort flowers.
Syritta pipiens (L.) April 29th at Longframlington ; Sept. 30th visiting ragwort flowers ; and Oct. 4th visiting tansy flowerhead.
Syrphidis [*Syrphus*] *ribesii* (L.) Oct. 4th visiting tansy flowerhead.
Tubifera [*Eristalis*] *horticola* (Deg.) May 17th.
T. intricaria (L.) May 4th.
T. nemorum (L.) May 24th.
T. pertinax (Scop.) Sept. 26th, Oct. 4th, visiting flowerheads of creeping field thistle, ragwort, tansy and yarrow.

PALLOPTERIDAE [in LONCHAEIDAE]

**Palloptera arcuata* (Fab.) May 24th.
P. saltuum (L.) May 17th.

TRYPETIDAE

Tephritis vespertina (Lw.) May 2nd.

LAUXANIIDAE [SAPROMYZIDAE]

Lyciella [*Lycia*] *rorida* (Fln.) May 17th. (This is *Cnemacantha rorida* (Fln.) of K. and H. List.)

TYLIDAE [MICROPEZIDAE]

Trepidaria [*Calobata*] *cibaria* (L.) May 24th.

PSILIDAE

**Psila nigra* (Fln.) May 12th.

SCIOMYZIDAE

**Pelidnoptera nigripennis* (Fab.) May 17th.
**Renocera pallida* (Fln.) May 17th.
**Sciomyza dubia* Fln. May 17th.

HELOMYZIDAE

**Helomyza flavifrons* Zett. April 9th.
**Heteromyza rotundicornis* (Zett.) May 12th.
Leria modesta (Mg.) s. *czernyi* Collart March 29th, April 19th.
**Oecothea fenestralis* (Fln.) March 23rd, April 2nd.
**O. praecox* Lw. May 2nd and 12th.
**Tephrochlamys rufiventris* (Mg.) March 21st and 29th. (Also recorded in *Parmenter*, 1947.)

OPOMYZIDAE

Geomyza tripunctata Fln. May 24th.

EPHYDRIDAE

**Coenia curvicauda* (Mg.) March 28th, April 4th.
**Hydropota incana* (Stenh.) May 4th.
Parydra aquila (Fln.) March 28th—May 24th.
P. quadripunctata (Mg.) May 4th.
**Scatella paludum* (Mg.) May 4th.
**S. stagnalis* (Fln.) May 4th.

SPHAEROCERIDAE [BORBORIDAE]

**Crumomyia nigra* (Mg.) May 12th.

DROSOPHILIDAE

**Drosophila* (s. *Scaptomyza*) *apicalis* Hardy May 2nd and 12th.

AGROMYZIDAE

**Dizygomyza luctuosa* (Mg.) May 12th.

CORDILURIDAE

**Norellisoma armipes* (Mg.) May 2nd.
Scopeuma [*Scatophaga*] *squalidum* (Mg.) March 28th.

LARVAEVORIDAE [TACHINIDAE]

**Blondelia nigripes* (Fln.) May 24th.
Crocuta [*Bucentes*] *geniculata* (Deg.) April 4th, visiting tansy flowers.
Ernestia rudis (Fln.) May 17th and 24th.
Lypha dubia (Fln.) April 19th.
Nilea [*Pales*] *pavida* (Mg.) May 24th
**Oswaldia muscaria* (Fln.) May 2nd and 17th.

CALLIPHORIDAE

Lucilia illustris (Mg.) May 4th.
Sarcophaga carnaria (L.) April 19th.
S. subvicina Rohd. [*vicina* Vill.] May 4th.

MUSCIDAE

Anthomyia pluvialis (L.) May 18th.
**A. procellaris* Rond. May 2nd.
Dasyphora cyanella (Mg.) Jan. 1st, March 21st.
Egle aestiva (Mg.) April 4th.
**Fannia kowarzi* (Verr.) May 12th and 17th.
F. scalaris (Fab.) April 2nd.
**F. sociella* (Zett.) May 24th.
Graphomya maculata (Scop.) May 23rd, Sept. 30th.
**Hydrotaea albipuncta* (Zett.) May 24th.
**H. meteorica* (L.) May 24th.
Hylemya lasciva (Zett.) May 24th.
**H. variabilis* Stein. May 4th.
H. variata (Fln.) April 6th.
Morellia hortorum (Fln.) May 24th.
Polietes lardaria (Fab.) May 24th.

Species additional to the above found in Northumberland during September, 1942, to May, 1943 :

TIPULIDAE : *Limonia nubeculosa* Mg., *Pedicia* [*Tricyphona*] *immaculata* (Mg.), *Tipula vittata* Mg.
ANISOPODIDAE : *Anisopus fenestralis* (Scop.), *A. punctatus* (Fab.)
BIBIONIDAE : *Bibio johannis* (L.), *B. laniger* Mg., *B. leucopterus* (Mg.), *B. marci* (L.), *B. pomonae* (Fab.), *Dilophus febrilis* (L.)
SCATOPSIDAE : *Scatopse notata* (L.)
EMPIDIDAE : *Empis chioptera* Mg., *E. trigramma* Mg., *Hilara maura* (Fab.), *Platypalpus* [*Tachydromia*] *agilis* (Mg.), *P. longicornis* (Mg.), *Rhamphomyia sulcata* (Mg.)
SYRPHIDAE : *Chilomyia* [*Chilosia*] *albitarsis* (Mg.), *Melanostoma mellinum* (L.), *M. scalare* (Fab.), *Neoascia podagrica* (Fab.), *Platycheirus* [*Platychirus*] *albimanus* (Fab.), *P. clypeatus* (Mg.), *P. manicatus* (Mg.), *Rhingia macrocephala* (Harr.) [*campestris* Mg.], *Syrphella* [*Syrphus*] *venusta* (Mg.), *Syrphidis* [*Syrphus*] *vitripennis* (Mg.), *Syrphus* [*Leucozona*] *lucorum* (L.), *Tubifera* [*Eristalis*] *arbustorum* (L.), *T. tenax* (L.)
PSILIDAE : *Psila nigricornis* Mg.
DRYOMYZIDAE : *Dryomyza flaveola* (Fab.)
HELOMYZIDAE : *Leria serrata* (L.)
SPHAEROCERIDAE [BORBORIDAE] : *Stratioborborus* [*Borborus*] *nitidus* (Mg.), *Trichiaspis* [*Borborus*] *stercoraria* (Mg.)

EPHYDRIDAE : *Hydropota* [*Hydrellia*] *griseola* (Fln.)
CORDILURIDAE : *Scopeuma* [*Scatophaga*] *stercorarium* (L.)
LARVAEVORIDAE [TACHINIDAE] : *Crocuta* [*Bucentes*] *cristata* (Fab.), *Gymnocheta viridis* (Fln.), *Phryxe* [*Exorista*] *vulgaris* (Fln.)
CALLIPHORIDAE : *Calliphora erythrocephala* (Mg.), *C. vomitoria* (L.), *Pollenia rudis* (Fab.)
MUSCIDAE : *Eriozischia* [*Delia*] *brassicae* (Bouché), *Helina lucorum* (Fln.) *Hydrotaea dentipes* (Fab.), *H. occulta* (Mg.), *Hylemya nigrimana* (Mg.), *H. strenua* Rob. Des. [*strigosa* (Fab.)], *Mesembrina meridiana* (L.), *Morellia simplex* (Lw.), *Myospila meditabunda* (Fab.), *Phaonia basalis* (Zett.), *P. errans* (Mg.), *P. incana* (Wied.), *P. serva* (Mg.), *Pseudomorellia albolineata* (Fln.)

This fine county, with its varied habitats from sea coast to mountains, should hold a great variety of diptera. It is to be hoped that some attention will be paid to the diptera by the entomologists of the county and by visitors, especially as the literature published in England will soon have dealt with practically the whole of this fascinating order of insects.

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FIELD NOTES AND RECORDS

Some Teesdale Mosses. Two weeks were spent in Upper Teesdale early in August with the object of seeing the mosses of the district and in particular trying to find some of the mountain Dicranums recorded by Spruce a little over a century ago. None of the latter materialised, however, and below is a list of the more interesting species noted in V.C. 65 :

Rhabdoweisia fugax B. & S., c. fr., below High Force.
R. denticulata B. & S., c. fr., Cronkley and Holwick Scars.
Cynodontium Bruntoni B. & S., c. fr., Cronkley and Holwick Scars.
Blindia acuta B. & S., c. fr., Cronkley Scars and Mickle Fell.
Rhacomitrium protensum Braun, c. fr., Cronkley Scars.
Barbula rubella Lindb. var. *dentata* Schp., c. fr., north of Park End Wood.
Leptodontium flexifolium Hampe, below Winch Bridge.
Weisia rupestris C.M., c. fr., White Force and north of Park End Wood.
W. curvirostris C.M., c. fr., below Winch Bridge.
Trichostomum tortuosum Dixon var. *fragilifolium* Juratz., Cronkley sugar limestone.
T. crispulum Bruch, White Force.
Anoectangium compactum Schwaeg., below High Force.
Orthotrichum affine Schrad., c. fr., north of Park End Wood.
Catoscopium nigritum Brid., c. fr., below Winch Bridge.
Webera polymorpha Schp., c. fr. (conft. F. Rilstone), Cronkley Scars (recorded for Mickle Fell by Baker).
Bryum argenteum L. var. *majus* B. & S. (det. F. Rilstone), Mickle Fell.
Heterocladium heteropterum B. & S., below High Force.
Pseudoleskea catenulata B. & S., Mickle Fell.
Brachythecium glareosum B. & S., north of Park End Wood.
Hypnum vernicosum Lindb., below Cronkley Bridge.
H. scorpioides L., Skyer Beck.
Hylocomium loreum B. & S., c. fr., below High Force.

There was a very dense growth of the hepatic, *Gymnomitrium obtusum* (Lindb.) Pears., in one part of Cronkley Scars.—G. A. SHAW.

Sphagna of Austwick Moss.

S. fimbriatum Wils. var. *intermedium* Russ., var. *tenue* Grav., var. *laxifolium* Warnst.
S. rubellum Wils.
S. acutifolium Ehrh.
S. quinquefarium Lindb.
S. plumulosum Röll
S. squarrosum Pers. var. *spectabile* Russ., var. *subsquarrosum* Russ.
S. amblyphyllum Russ. var. *macrophyllum* Warnst.
S. pulchrum Warnst.
S. recurvum P. de B. var. *robustum* Breidl., var. *majus* Ångstr.
S. fallax von Klinggr. var. *laxifolium* Warnst., var. *Roellii* Schlieph.
S. cuspidatum Ehrh. var. *falcatum* Russ., var. *submersum* Schp., var. *plumosum* Bryol. germ., var. *plumulosum* Schp.
S. obesum Wils. var. *canovirens* Warnst.
S. inundatum Russ. var. *robustum* Warnst., var. *eurycladum* Warnst.
S. auriculatum Schp. var. *laxifolium* Warnst., var. *racemosum* Warnst.
S. crassicladum Warnst. var. *diversifolium* Warnst., var. *intermedium* Warnst.
S. papillosum Lindb. var. *normale* Warnst.
S. cymbifoium Ehrh.
S. magellanicium Brid.

Having made many gatherings of these plants at various visits to the Moss, I think the list must contain nearly all the *Sphagna* to be found there.—A. Thompson.

Early Yorkshire Botanists.—I recently dispersed into the herbarium at the Tolson Memorial Museum, Huddersfield, the best plants from accumulations of botanical gifts. Amongst valuable gifts from Mrs. Woodhead is a most interesting compilation by the late Dr. T. W. Woodhead, F.L.S. (a former President of the Union) relating to early Yorkshire botanists. The memorial is written on full-sized herbarium sheets and furnishes a brief outline of the botanical career of these students of Yorkshire Botany, the foundation builders of Yorkshire's botanical records. In addition there is a photograph of the majority of them, and of those who had been honoured by their name being associated with some plant there is either a pressed specimen of the plant or a drawing of same. The following is the list of the botanists whose names are included in the memorial, *viz* :—

Anthony Ascham, Vicar of Burniston, near Bedale, flourished 1550.
James Backhouse, Senr., 1794-1869.
Samuel Brewer, 1700-1742.
Daniel Cooper, A.L.S., 1817-1842.
James Dalton, M.A., F.L.S., 1765-1843.
John Fothergill, M.D. L.R.C.P., F.R.S., 1712-1780.
Sir Thomas Frankland, Bart., M.A., F.L.S., 1750-1831.
Samuel Gibson, 1790-1849.
Thomas Johnson, M.D., Lt.-Col., born at Selby 1644.
Robert Creaser Kingston, 1846-1872.
Thomas Knowlton, F.L.S., 1692-1782.
Martin Lister, M.A., M.D., F.R.S., F.R.C.P., 1638-1712.
Alexander Carroll Maingay, M.D. (Edin.), 1836-1869.
Giles Mumby, 1813-1876.
Thomas Nuttall, 1786-1859.
George Oxley, died 1829.
Joseph Priestley, F.R.S., LL.D., 1733-1804.
Richard Robertson, M.B., M.D. (Leyden), F.R.S., 1663-1741.
Richard Anthony Salisbury, 1761-1829.
John Ellerton Stocks, M.D., F.L.S., 1822-1854.
Robert Teesdale, born 1804, no death date. (Gardener to the Earl of Carlisle, Castle Howard).
T. Tofield, 1730-1779. An eminent botanist of Doncaster.
William Turner, M.A., M.D., 1510-1568.
Hewett Cottrell Watson, F.L.S., 1804-1881.
William Williamson, M.A., F.L.S., 1819-1886.
John Windsor, F.L.S., 1787-1868.

W. E. L. Wattam.

THE SWALLOW (*HIRUNDO RUSTICA RUSTICA* L.) AND ITS ARRIVAL IN NORTHUMBERLAND AND DURHAM IN 1949

C. J. GENT

In the spring of 1944 whilst serving with H.M. Forces I was stationed in Egypt on the western shore of the Great Bitter Lake. The European Swallow (*Hirundo rustica rustica*) was first observed on March 26th and last seen on May 18th, its numbers fluctuating with a number of peak dates, *viz.* March 29th, April 9th, 15th, 19th—23rd, May 3rd, 6th—8th, 13th—14th, and May 18th, indicating a passage through the area in a series of waves. The most striking point, however, was that the birds were generally seen in twos and threes : on two occasions groups of 12 and 16 respectively were noted. The Swallows generally travelled northwards when a northerly wind was blowing, and when on the move had a directness in their flight.

On my return to England the Royal Meteorological Society's Phenological Returns were analysed for a number of years with a view to ascertaining whether they threw any light on the movement of the Swallow into Northumberland and Durham, but unfortunately there were too few reporting stations for the records to be really useful. The records on the Tees did suggest the possibility of migration up that river, but on the Tyne it was found that the earliest average dates were the furthest inland.

The accounts of the detailed study of the movement of the Swallow and other migratory birds through Devon and Cornwall by means of co-operative watching given in E. W. Hendy's book, *Here and There With Birds*, and also in his article in *Discovery* (March, 1935), suggested that useful results might be obtained if an inquiry on similar lines were organised in Northumberland and Durham. A number of persons known to be interested in birds were, therefore, circularised, and letters were written to several of the local papers. A note was also included in the *Vasculum* (June, 1949).

Observers were asked to report :—

(i) Place.
(ii) Date first Swallow seen.
(iii) Date seen in numbers : (*i.e.*, 6 or more present in a district).
(iv) Observer's name.

In addition, information was requested respecting any movements noted.

It was decided to group the records in sub-vice counties (*vide* A Scheme to simplify recording in Northumberland and Durham by Dr. F. C. Garrett, *Vasculum* XXXII, page 4), any subsequent increase in numbers reported being included as a further arrival.

The records suggest that an early wave of Swallows arrived in the area on or about April 5th, but that the main arrival was during the period April 15th to 20th. It may be argued that the early records should be discarded as being due to Sand Martins wrongly reported as Swallows, but some of the reports were by reliable observers whilst in other instances data was given which suggested that there was no doubt that the birds seen had been Swallows. It is significant that most early records were from well inland suggesting overland migration rather than up the coast and then along the river valleys, which in the main run east and west. This is supported by the records of actual movements received :—

April 13th. One flying N.W. at 12 noon B.S.T., Haltwhistle (V.C. 67 D.)
Two flying N.W. at 1 p.m. B.S.T., Haltwhistle (V.C. 67 D.)
(M. Philipson)
April 15th. Numbers travelling N. to N.-W. at Hartburn (V.C. 67 B.)
(W. G. Smith)
April 16th. Two flying N.W., Rowlands Gill (V.C. 66 B.) (C. Hutchinson).
April 20th. One flying N. at 6 p.m. B.S.T., Gosforth (V.C. 67 B.) (C.G.)
April 22nd. One flying W.N.W. at 8-15 a.m. B.S.T., Gosforth (V.C. 67 B.) (C.G.)

The period of the main influx coincided with Easter weekend, and would undoubtedly be accentuated by the increased opportunities for observing due to the holidays. Some of the reports, however, are from residents in country districts so that it is probable that a fairly accurate picture of the movements has been obtained.

Several observers commented on the fact that Swallows were fewer than usual this spring, whilst in some instances the birds were late in arriving at their breeding

SUMMARY OF REPORTS OF ARRIVALS OF SWALLOWS (*HIRUNDO R. RUSTICA*) IN NORTHUMBERLAND AND DURHAM 1949

	DURHAM V.C. 66					NORTHUMBERLAND						
						Tyneland 67			Cheviotland 68			
Date	East Durham 66A	North Durham 66B	Mid Wear 66C	Upper Weardale 66D	Upper Teesdale 66E	N'land South Coast 67A	Mid N'land 67B	North Tyneland 67C	South Tyneland 67D	C'land Coast 68A	West C'land 68B	Total
April 1												
2												
3							1					1
4										1		1
5				1	1		3				1	6
6				1			2					3
7			1								1	2
8												
9	1									1		2
10			1						1			2
11									1			1
12	1							1	1			3
13								1	1			2
14							2	1			1	4
15	1	1				1	1		3			7
16	1	1	1				1		1	1		6
17	1		2				1	1	1		1	7
18		1	2			2					3	8
19	1	1								1		3
20		3			1		1		1			6
21												
22							1					1
23				1		1				2	1	5
24								1	1		1	3
25												
26							1		3	1		5
27					1		1					2
28												
29												
30												
May 1					1							1
2												
3												
4												
5									1			1
6												
7												
8												
9												
10												
11												
12							1				2	3
13												
14												
Total	6	7	7	3	4	4	16	5	15	7	11	85

stations. At one station in the Gosforth area (V.C. 67 B.) they were not seen until May 12th.

The writer's thanks are due to the many observers whose records made this report possible; unfortunately too lengthy a list to mention individually.

THE GANNETS OF BEMPTON

A. J. WALLIS

The small and struggling colony of Gannets (*Sula bassana*) on the cliffs at Bempton, East Yorkshire, is, by now, well known to Yorkshire naturalists, and its success is watched each year with eager interest. Hopes that the number of pairs nesting will increase show little signs of being realised, a fact which is hardly surprising as the number of ledges which would appear suitable for these birds is limited.

Owing to the nature of the cliffs some difficulty was experienced in keeping a careful watch on this small colony, and during 1949 it was found that at least one pair were using a ledge which was not visible, from any point along the cliff top. The difficulty, practically amounting to impossibility of approaching along the shore precluded any observations from below. One ledge, believed to be the main one used by the birds, is clearly visible from the top of the cliffs, and some eleven visits were made to observe the success of the Gannets using this nesting site. The details of their success are given below.

March 27th. Two Gannets were watched as they flew in and out of the cliffs, one carrying nesting material to a ledge which was not visible. At this time the auks were present in some numbers, but mainly on the sea, very few being seen on the cliff ledges.

April 18th. There was great activity amongst the Gannets, five being the largest number seen together at any one moment. One bird spent the whole time sitting on a ledge, preening and sleeping. Three birds, giving the impression of being a pair and a single bird, were actually engaged in nest building. The pair were more successful, being able to keep a continuous guard, and to take every opportunity of stealing material from the nest of the single bird. The fifth bird was coming and going to a ledge out of sight.

When the pair were together on the ledge normal courtship display took place, with bowing and scissoring of the bill. In addition the peculiar display adopted by these birds prior to departure from the nesting ledge was seen on each occasion when a bird took wing. It was then it was noticed that the birds were all crossing their feet on top of their tails as they became airborne. This position was held until some major turn in the direction of flight was made, when the feet were moved to the normal position beneath the tail. This habit has not been observed previously nor subsequently, nor can any reference to it be found in literature describing the flight of the Gannet.

May 6th. Four birds were seen sitting on the main nesting ledge. The pair had a nest of considerable proportions, but there was no sign of the second nest. One bird remained on the nest throughout the visit, and never moved sufficiently for any egg to be seen.

May 21st. Some accident must have occurred, as there was no trace of any nest, and only one bird was present. The climbers could offer no explanation for the disappearance of the nest.

May 28th. Five birds were seen, all on the wing out to sea, being kept from the cliffs, possibly, by the activities of the climbers in the neighbourhood of their ledges.

June 4th. Two birds were present on the nesting ledge, but quite inactive, just sitting asleep, or preening themselves.

June 9th. A sudden thick mist along the cliffs prevented any observations, though it was interesting to note that the mist did not appear to disturb the birds unduly. Razorbills and Guillemots kept appearing out of the mist, flying past without any sign of slackening in their speed. The Kittiwakes were also flying over the cliff top to pay their usual visits to a pond in which they regularly bathe.

June 12th. On the main ledge three Gannets were sitting, one on a small heap of weed, suggesting that a new nest had been built.

August 1st. After a break in observations caused by absence from the district, little change was apparent in the situation noted on the previous visit. Three birds were present, all on the main nesting ledge. One bird was sitting on the nest, and though never still for long, never stood up sufficiently to allow any egg or young to be seen. This bird spent the time preening, sleeping, and re-arranging the nesting material around the edge of the nest.

August 14th. A young Gannet was seen in the nest. It was very small, though old enough to have grown a covering of white down. During the visit no

attempt was made to feed the youngster, both parents sitting beside the nest and continually fondling their offspring with their bills. Courtship display by the adults was seen, and they still adopted the peculiar actions before leaving the ledge.

By this date all the Auks and the majority of the Kittiwakes had left the cliffs, Fulmars being the only species frequenting the ledges in any numbers.

August 28th. Three adult birds were present, the pair sitting beside their young one which had grown considerably, and was capable of walking around the nest. The parents were both seen to preen the down on the young bird, but no move was made to feed it during the period they were watched.

All other species had left the cliffs by this time, except for one or two young Fulmars seen exercising their wings, and obviously nearly ready to leave for the open sea.

No further visits to the cliffs were possible, and whether the young Gannet left the cliff ledge safely is not known. It is also not known whether a second pair, using the ledge not visible from the cliff top, were successful in rearing a family.

YELLOW WAGTAIL AND REDSTART

RALPH CHISLETT

The Redstarts (and Wheatears) were classed by Linnaeus with the Wagtails, from which they are now separated by the whole companies of Warblers and Tits. The only reason for bracketting the Yellow Wagtail and Redstart here lies in the fact that the publishers of the New Naturalist Monograph series of books have recently produced monographs on each.* They are the first books in the series dealing with single species of bird and have been awaited with interest by those who knew they were in preparation.

Monographs concerning single species are not new nor did they begin with David Lack's *The Life of the Robin*. In the earlier years of this century books were produced that even dealt with a single colony, or single pair of birds, with but little reference to the rest of their race. In their introduction to John Buxton's *The Redstart*, the New Naturalist editors express the hope that every species will have its own monographer—bookshelves would need to become elastic but the ideal is not impossible—then add : ' it will be a long time before the Redstart needs another.' There's the rub. Never did books become out-of-date so quickly as to-day. Ornithology is not static, even of species that have been monographed at length. Another book will be needed inevitably as specialisation on a single species becomes more prevalent. Already I hear of people who have been waiting to assimilate the contents of Buxton's book as a step towards their own programme of field work.

Authorship of a monograph should only be attempted by those who know the species really well, from personal experience in many places, with many individual birds ; otherwise how can the values of the works of others be correctly assessed ? A monographer cannot afford to ignore any work previously done on his species in this country or abroad and innumerable papers, county histories and regional reports must be sifted in addition to the more general works with which he should be familiar. The labour involved is great. All facts of importance should be presented objectively so as to speak for themselves. Speculative theories should be based on reasons supported by facts and discussed without finality or dogmatism in the light of biological trends.

Stuart Smith was equipped for his task with the results of years of close study of the Yellow Wagtail in his own area of Cheshire. John Buxton had the misfortune to spend five years of World War II in German hands ; and made the Redstarts that nested about his prison-camps his special study, putting up nesting-boxes to encourage them. He has also had wide experience elsewhere.

The scope of each book is comprehensive. The patterns followed are similar, only varying in sequence. Breeding distribution, winter quarters and migration,

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* *The Redstart* by John Buxton. Pp. 180 with 20 photographs by Eric Hosking and 20 maps and diagrams. Collins, New Naturalist Monograph No. 2, 12/6.

The Yellow Wagtail by Stuart Smith. Pp. 178 with 26 paintings by Edward Bradbury, 11 photographs by the author, 4 line drawings and 4 distributional maps. Collins, New Naturalist Monograph No. 3, 12/6.

which precede the various aspects of nidification in Smith's book, follow them in Buxton's. Each writer has endeavoured to encompass the life histories of individuals and of the species with which he is concerned. Consideration of the related geographical races in Europe and elsewhere conclude each book.

In *The Yellow Wagtail*, Stuart Smith should dispel some curiously widely-held misconceptions of the status of that species in northern England. Not long ago, the writer of a scientific column in a national weekly told his readers that in the north of England the Grey Wagtail takes the place of the Yellow Wagtail; what nonsense to have been written by a scientific journalist! Even *The Handbook of British Birds* itself, which many writers have obviously copied, has failed to satisfy us with its statement concerning habitats of this species. Smith's Appendix A, p. 135, dealing with V.C. 64 and 65 should set that right.

There are many points in each book that invite discussion. The most interesting parts of many books are those that are least definite; the speculative parts in which intelligence has worked on facts that may not always seem to be quite adequate. The author's object may have been achieved if thoughts are stimulated, some of which may be transferable to other passerine species.

To trace in detail the distribution and breeding density of a numerous small passerine bird is far more difficult than to do the same with a larger species known to prefer particular types of countryside. Buxton hardly attempts it with the Redstart, or only very generally. Smith's map probably presents the composite picture of the Yellow Wagtail's British distribution as accurately as its size will allow. Of the vice-counties I am only qualified to deal with the five that subdivide Yorkshire. I should not call the Yellow Wagtail rare *everywhere* in V.C. 61; only on the Wolds themselves. Breeding pairs occur not uncommonly along the Humberside, and in a few places in Holderness and further north. Regarding V.C. 62, since 1947 two or three pairs have bred annually in Pickering Vale from which it is no longer 'absent.' In V.C. 63, Yellow Wagtails *are* somewhat scarce to the east of Doncaster, but breed fairly numerously a few miles westward. For V.C. 64 and 65, Stuart Smith has cited Nelson whom *The Handbook* apparently ignored, and the distributional map is shaded for the upper dales as intensely as for the coastal areas of East Anglia. I see no reason for the suggestion of an increase in the Yellow Wagtail population of the upper dale country since Nelson's time; it was numerous there in 1906 and is so still. Evidence of a good breeding season in 1949 in higher Airedale was afforded by *ca.* 500 birds at Swillington Ing on August 21st, recorded by K. Dawson. Whether it is correct to call 'Norfolk and south-east England generally' the area of 'greatest breeding density' is a moot point, not quite supported by the distributional map. The 'tendency for the numbers to diminish along any river valley as the head-waters are approached' hardly applies to the fast-running rivers of the Pennines; rather the reverse until the high ground itself is reached, where breeding birds may still occur after the thousand-foot contour has been passed.

Whether Yellow Wagtails nest less numerously in cornfields to-day than in John Ray's time can be no more than matter for surmise. Any increase in V.C. 63 in recent years has mainly occurred in just such habitats, which are subject to the effects of crop rotation. Provided the herbage remains low and away from trees, how much does ecological environment matter to the Yellow Wagtail? G. W. Temperley is quoted concerning Co. Durham—'the tenacity with which it will remain in an area long after it has been encroached by roads, railways and buildings is remarkable.' Lack of adaptability is illustrated by F. A. Bak, of Leicestershire—'the fields adjacent to the river were grassland up to 1940. Then many were ploughed up and the bird became less common.' Observation over a period of years of corn-nesting birds in south Yorkshire would be interesting in view of crop rotation. Do the Yellow Wagtails affected change their fields with the rotation; or do they accept alteration in their environment? The author locally found more pairs of birds on land under potatoes than when under other market-garden produce; but the conclusion that 'certain of the local Wagtails are exclusively potato-plant nesting' seems to require more evidence. 'The problem remains fascinating'—and offers scope for further research.

Let us turn to John Buxton's *The Redstart*, where the first phrase to arouse a challenge occurs on the cover—'in this country a secretive inhabitant of the wood edge.' 'Secretive' surely infers silence, not loud reiterations from an easily remembered voice, to count the owners of which in spring in any area is the easiest

method of assessing numbers. 'Wood edge' is correct as far as it goes ; but in open woods one can go further and find Redstarts. In the Pennine valleys, a few gnarled ashes or oaks below an escarpment of limestone or grit, or a little group of old rowans or birches, are often quite sufficient woodland for a pair of Redstarts. The species of tree matters little, or even if any have holes, provided such are offered by an adjacent drystone wall. Neither wall nor outcrop, whether limestone or grit, will attract Redstarts if trees are absent from the vicinity.

In their preface the editors say : 'It is no longer, perhaps, advisable to attempt to distinguish in ornithology between the amateur and the professional.' It never was, except among those hampered by a professional outlook. Does 'perhaps' savour a little of professional patronage? 'Advisable' scarcely seems to be the best word they could have used.

Following Siivonen in Finland, Buxton argues in favour of the theory that Redstarts originated in pine-forest country and adapted themselves to new conditions as the forests vanished. His reasons fail to convince me. Far beyond the pine-country in Lapland I have found Redstarts breeding in birch forest, using holes at any altitude, more numerously than I have ever found them in the Invernessshire remnants of the old Caledonian pine-forests. Very occasionally elsewhere I have seen an odd Redstart's nest under hillside bracken ; but whether the species originally nested on the ground is pure speculation, with at least as much evidence against as for. Nor can I agree 'the Redstart should be considered a hole-nesting bird in the sense in which the Wheatear is so, and should not be compared to the Tits or Pied Flycatcher.' Redstart and Pied Flycatcher have much in common ; they prefer similar types of countryside and in the Pennines and Lakeland often occur together, competing both for nesting-sites and food. Both lay blue eggs, sometimes at ground level, and on passage migration often occur together. Bird-watchers must accept what 'the systematists have decreed,' until they decree otherwise. A habit such as that of shivering the tail, even 'in an entirely characteristic manner' hardly seems to be sound ground for differing from them.

Some of Mr. Buxton's views traverse many species. Thus 'the hen lays her eggs and broods them but cannot foresee the chicks that will emerge' ; she knows well enough what is happening when the eggs begin to chip. Again—'Two or three species have taken to living only near fresh water'—it depends on the interpretation of the word near ; but neither Redstart nor Pied Flycatcher, nor many other passerine species, ever nest far from fresh water in Britain. That nidicolous young hatched in holes or covered nests tend to stay there longer than those reared in open nests was remarked in the pre-Lack era. Concerning incubation periods —from 10½ to 17 days with the Redstart—I have long thought that insufficient consideration has been given to the possible effects of reductions in temperature caused by disturbances.

Precise information of the migrations of the Redstart comes very slowly to us in Britain. We ring some Redstarts on passage at Spurn (64 in 1949), but know not whence they come or where they go. Nor do we know aught of the origins or destinations of the several Black Redstarts we ring there each year. Buxton's maps in Appendix I show recoveries of birds ringed in northern Europe that have travelled south-south-west mostly to the Iberian peninsula. Some of the birds were ringed on Heligoland. Large numbers breed in Scandinavia, and we have no knowledge as yet whether the passage birds at Spurn come thence or are British bred. Ringing of nesting-box birds could possibly give interesting information of homing individuals, perhaps of pairs.

Other points that stimulate thought more effectively than the correct statement of detail are presented by these books. Each is pleasantly written, is full of sound information, and well illustrated : *The Redstart* by Eric Hosking's photographs, *The Yellow Wagtail* by Stuart Smith's own, and by some beautifully drawn and reproduced colour plates by Edward Bradbury. They are excellent examples of the modern ornithological trend, books in which the authors study the details of the lives of individual birds from every angle, and have competently collated the work of others, and assembled all with vision. To each book we shall refer frequently. Both are by amateur ornithologists ; one, *The Yellow Wagtail*, coloured by the scientific outlook of Stuart Smith whose branch of applied science is far removed from bird-watching ; the other, *The Redstart*, by the more philosophic but controlled outlook of a poet. Each author would acknowledge that there remains a great deal to be learned about his species.

The Naturalist

In Memoriam

CAPTAIN S. E. EVANS, M.B.E., M.A.
(1877—1950)

MEMBERS of the Vertebrate Section of the Yorkshire Naturalists' Union will be grieved to learn of the death of Captain S. E. Evans at the age of 73 after a short illness. Educated at the Manchester Grammar School he proceeded to Wadham College, Oxford, where he duly graduated with honours. Thereafter he was appointed a classical master at the Doncaster Grammar School, and this became the scene of his life's work. Following his retirement in 1942 as senior classical master he was twice recalled to assume the headship of the school during difficult

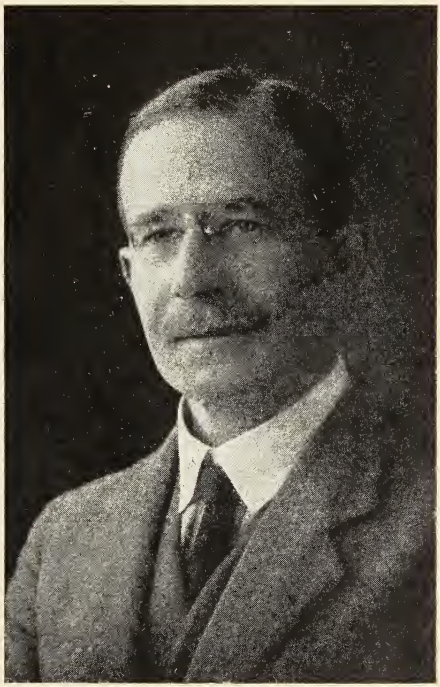


Photo by] CAPT. S. E. EVANS [*Percy J. Sansom*

periods of change, and there is little doubt that these additional duties at an advanced age imposed a strain upon his constitution.

Evans possessed all the qualities required by his exacting profession and was held in the highest regard by all who had learnt their classics, and much besides under his patient and kindly rule. Endowed with an excellent memory, he was never at a loss when confronted by an erstwhile pupil, and at a reunion dinner he was always a centre of attraction.

During the first world war Evans left the school and served with distinction as musketry officer of the Third Reserve Infantry Brigade, and his work in that capacity was suitably recognised by the award of the M.B.E. In the second world war he served on various military selection committees and again did much valuable work of a less active nature.

The writer first met Evans in 1915 and looks back with gratitude to an unclouded friendship extending over 35 years. Many holidays and excursions were undertaken together, including a tour of Ross and Sutherland in search of birds

peculiar to that remote region. He had a wide knowledge of the habits of most of the British birds and a very good ear for their songs and call notes. The writer persuaded him to join the Y.N.U. in 1922 and looked forward keenly to putting him up at the time of the meetings of the Vertebrate Section.

In 1940 Evans was elected Chairman of the Yorkshire Mammals, Amphibians, Reptiles and Fishes Committees, and so continued until failing health made it impossible for him to continue. All who attend the meetings of the Vertebrate Section of the Y.N.U. will miss the kindly presence of one who loved humanity and made no enemies.—E. Wilfred Taylor.

WILLIAM BUNTING CRUMP, M.A.
(1868—1950)

In recent years the late W. B. Crump was best known, perhaps, as the historian of the woollen industry in the West Riding. To a younger generation it may come as a surprise to learn that by training he was a scientist, by profession a schoolmaster, and by circumstances, for a few years, a business man.

He was the third son of a Wesleyan minister, Rev. Simpson Crump, and was born at Scarborough on April 26th, 1868. From 1879 to 1887 he attended Bradford Grammar School and could tell many stories of those days ; he then went up to Queen's College, Oxford, on a Hastings Exhibition granted to him for proficiency in science. As at school he had obtained distinction in physics, chemistry and geology, so it was with a first-class degree in Natural Science (Chemistry) that he left Oxford in 1890. For twenty-four years he served as science master at Heath Grammar School, but increasing deafness made him resolve to retire from the teaching profession by 1914. He thereupon became the owner of a cinema in Brighouse, and retained it until the year 1921.

In this first half of his long career, he produced a number of outstanding contributions to what had become his chief hobby, botanical science. His book on the flora of Halifax, compiled in collaboration with the late C. Crossland, was published during the same period in which he acted as editor of the *Halifax Naturalist*, but of this and his work as a botanist, it is for Dr. Sledge to speak with proper authority.

In the 'twenties he removed to Leeds and at once made his mark as a local historian of great competence. It is obvious that he had long taken an interest in local antiquities, even while teaching science at Halifax, and the fruits of his deep and patient study of the ancient highways of that parish appeared in a series of papers published by the local antiquarian society. Thereafter, his love of old maps and road-books never left him ; his further studies of road-systems and the work of English cartographers resulted in a series of papers published in various journals, and, finally, in the charming book on the highways of Huddersfield which he had the satisfaction to see published by the Tolson Museum a few weeks before he died.

He was by now keenly interested in most of the subjects dear to the antiquary—place-names, architectural relics of a former day, folk-lore and dialect, and long-forgotten aspects of domestic life—and a series of shorter papers will show that his interest in these things was neither shallow nor second-hand. Latterly he had spent much time on the revision of his book *The Little Hill Farm, Calder Valley*, first issued in 1938, and it is sincerely to be hoped that a publisher will be found for this valuable contribution to the social history of Yorkshire. In recent days, however, he had come to regard himself as above all an economic historian, and within the sphere of economic history as the particular historian of the West Riding woollen industry. The book which firmly established his reputation far beyond the immediate locality was that collection of documents concerning the woollen industry at Leeds during the period 1780 to 1820 which he edited for the Thoresby Society in 1931. This work was immediately acclaimed a first-rate contribution to economic history and no history of the Industrial Revolution which neglects it can be looked upon as satisfactory. With Gertrude Ghorbals he wrote for the Tolson Museum's series of handbooks a history of the Huddersfield woollen industry of rather wider scope and more general interest.

In the past four or five years a gradual weakening of his sight, together with his long-standing deafness, made it impossible for him to give all the attention he so much wished to give to research and editorial matters ; but he bore up amid

these afflictions with great courage, never relinquished his interests for a moment, and to the very last was engaged in further research. In the very incidents of his varied career, sketched so briefly and inadequately in these notes, there is evidence of a man who possessed clear vision, great determination and matchless courage. To the Thoresby Society, at any rate, he gave new vigour, not only by his editorship, by his own contributions to its publications or by his frequent lectures, but, not least, by his wise counsel and encouragement of younger men.

Yet it is as the ideal editor that the writer best remembers him : as such, the things he would not tolerate were many—trivial subjects, slovenly writing,

Photo by H. G. Grainger, F.R.P.S.

Mr. W. B. Crump

printing that was less than the best. He was tireless in eliminating superfluities and punctilious in the extreme about spelling, grammar, and the excessive delight that some compositors had for the use of ' stops.' On these points he was an exacting master. But it is rather of him as friend and counsellor, as fellow student of local antiquities, that I shall like to think of him. He knew so much himself even on matters about which ' experts ' wrote that he was able to correct the specialists, and many a line, often a whole paragraph, and sometimes a whole page that goes under someone else's name is really his. No one gave his time and stores of knowledge more freely to all who consulted him and showed that they could benefit from them ; and scholars from far and near were not slow to make his acquaintance and take advantage of his generosity. It is as a man of unruffled patience, deep and exact knowledge of all phases of local history, and of keen and practical sense in the minutiae of printing and publishing learned papers that fellow workers will respect his memory. He himself never hastened into print, and, because his books and papers are the fruit of long accumulation of fact, constant revision, and unwearied consultation with the best authorities, they will endure.—F. Beckwith.

1950 April-June

Mr. W. B. Crump's botanical work was all done in the period during which he lived at Halifax and his name will be remembered as a joint author of the very competent and comprehensive *Flora of Halifax*. As a parish *Flora* this work has never been surpassed. It was issued as a supplement to the *Halifax Naturalist* (1896—1904) of which Mr. Crump was at that time acting as editor. Though he ceased active botanical work after he left Halifax his interest in the natural history of this area remained and he kept his own interleaved copy of the *Flora* posted up-to-date with records and much additional information typical of his many-sided interests.

A manuscript note in his own copy of the *Flora* states that he was solely responsible for the introduction and the sections covering the vascular plants, Charles Crossland being responsible for the lower groups. The introduction contains an excellent account of the ecology of the district. This was an entirely new feature in a work of its kind for the study of plant ecology in Britain was then in its infancy and Crump and his friend C. E. Moss, who was at that time living at Halifax, with T. W. Woodhead of Huddersfield, and W. G. Smith at Leeds, were amongst the pioneers in the new method of field study. He early became a member of the British Vegetation Committee which was formed about this time and which later became the British Ecological Society, and he contributed papers to the first two volumes of the *Journal of Ecology*. He was also a good photographer and amassed a large collection of lantern slides illustrating most of the types of British vegetation. A few months before his death this valuable collection was given to the Botany Department of Leeds University.

As would be expected in a man who combined antiquarian and historical with botanical interests, Mr. Crump had a wide knowledge of bygone Yorkshire naturalists. His community of interests was also well illustrated by his study of the distribution and history of the autumn crocus (*C. nudiflorus* Sm.) in the Halifax area. His views on the probable origin of this plant were published in two newspaper articles published over forty years ago but his interest in the problem was maintained and new facts were accumulated. It had long been his intention to revise and amplify this work but his failing health and preoccupation with other matters made this impossible and at his request I prepared an article from the notes which he handed over to me last summer and had almost completed the paper at the time of his death. It was his wish that this should be published in *The Naturalist* and it is a matter for regret that he did not live to see this paper in print. Its early publication will however serve as an appropriate reminder of the subject in which his early interests lay and in which he established the high reputation which was to characterise his work in those other fields of study to which he was attracted in later life.—W. A. Sledge.

At the meeting of the British Association for the Advancement of Science at Newcastle, August, 1949, the following recommendations were sent forward to the Council of the Association by the Conference of Delegates of Corresponding Societies :—

(i) There is a great deal of technical skill that members of our Corresponding Societies might be prepared to put at the disposal of researchers in this country. Many research workers have their work delayed because they do not have the skill requisite to secure the results at which they are aiming. Section making, photomicrographic work and other photographic records could be done, and that gladly, if the want were only known. It was suggested, therefore, that the Council should approach the Corresponding Societies with a view to securing their co-operation in such a scheme.

(ii) At several International Congresses in recent years it has been stated that scientific work has often been overlooked because of language difficulties. The Council is consequently asked to circularise the Corresponding Societies and suggest that those publishing research work should instruct authors to supply a digest not exceeding 200 words, and that the societies should print the digest at the head of the articles in question. These should be authors' summaries, because it has been reported that some authors have objected that their work has not been fairly represented in works that specialise in publishing critiques.

Anyone who can offer their services under the first of these recommendations is asked to forward his name to C. A. Cheetham, Austwick, nr. Lancaster.

SOIL *p*H DETERMINATIONS

The Editor of The Naturalist.

SIR,

I should like to comment on the paper by Messrs. Tordoff and Dearing entitled ' Material for a Study of Tree Regeneration ' in *The Naturalist*, 1949, 91-97. My comment concerns solely the values given for the hydrogen-ion concentration of the soil samples. These, which vary from *p*H 6·5—8·6, seem very high for a soil which is described as non-calcareous. (Similar high values are given in the second paper by the same authors in *The Naturalist*, 1949, 145-147.) Out of 37 citations of pH value 31 are alkaline, 2 neutral, only 4 acid and these only slightly so. A specially high figure 8·6 is explained as being from a hollow into which bases could easily leach. It would be interesting to know what bases the authors refer to here and in general what bases, in the absence of calcium, can so prevail over the usual tendency to acidification in non-calcareous soils as to render these soils almost uniformly alkaline.

I have myself taken very numerous soil and drainage-water samples in mid-Airedale (underlying rock millstone grit) and have had a number of these carefully checked by the electrical method. I have found that these soils range from 3·5 moorland to 6·5 woodland and that only in places where morainic material containing limestone occurs do the *p*H values reach 7·0 or at most 7·5. On the mountain limestone itself, e.g. in the Grassington area, the value in flat places often does not reach 7·0 though the figure reaches 7·5 on the slopes. I have found values as high as 8·0 only on the Permian limestone.

I should like also to quote the figures given by Professor Pearsall (figures with which my own determinations agree) in his Presidential Address to the Y.N.U. in 1937 (*Naturalist*, 1938, 57-64). His table shows a ground flora of *Holcus mollis* growing on soils ranging in *p*H value from 3·8 to 5·2, *Pteridium aquilinum* *p*H 4·0—5·3 and *Deschampsia flexuosa* pH 3·3—3·8. Contrast these with the figures of Messrs. Tordoff and Dearing, *Holcus mollis* *p*H 6·5—8·2, *Pteridium aquilinum* *p*H 6·8—7·2 and even soil growing *Deschampsia flexuosa* (under oak) is given a *p*H value of 7·2 (Table I). The discrepancies here are so large that *p*H values become quite misleading unless some cause for the difference can be found. It is highly desirable that all workers on *p*H values should have a common standard.

A MALINS SMITH.

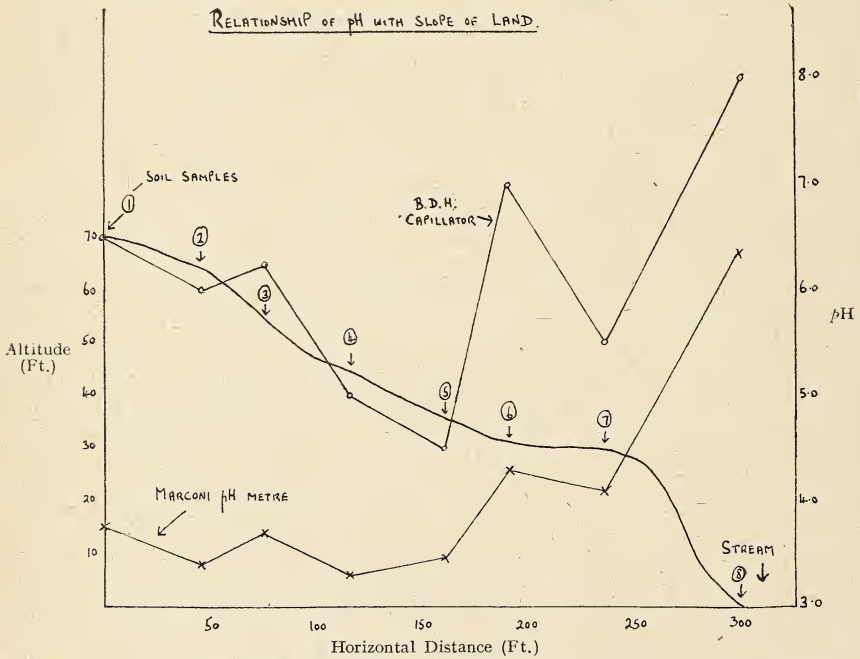
MR. MALINS SMITH, in his letter referring to our papers, ' Material for the Study of Tree Regeneration ' and ' Notes on Plant Succession in Herbaceous Communities at Norwood Green,' questions the validity of the numerous *p*H values recorded therein. These values were recorded in our papers without comment and no comparisons were made with conditions obtaining elsewhere. It is gratifying to observe that the topic arouses sufficient interest for others to furnish comments and comparisons.

It was realised that electrical determinations of *p*H were to be preferred to colorimetric ones and only the non-availability of the laboratory *p*H calomel-electrode apparatus at the time this work was being done prevented us from using that method. Our soil collections comprised some 120 individual samples from the humic crumb of the herbaceous rooting layer. These were tested mainly in the field, using a B.D.H. Capillator. The unexpectedly high values were early recognised by Dr. Sledge and the authors and on that account the capillator was checked against known buffer solutions in the Leeds University Botanical Laboratories by Dr. R. D. Preston.

Further examination of the soils has been undertaken recently. Soil samples were taken from the east-facing slope and the transect ran along a line similar to that referred to under the heading ' East-facing Slope ' in the original paper. The samples were again taken from the humic layer in which herbaceous rooting systems were established. Duplicate sets were then prepared by dividing each sample into two parts. One set was sent to Dr. Sledge for estimations of *p*H with a Marconi electric *p*H-metre standardised prior to use with a buffer solution of known *p*H. The samples of the second set were estimated colorimetrically by one of us using a B.D.H. Capillator and B.D.H. Soil Indicator. The results are tabulated overleaf.

	Level	*Tree Shading*	*Herbaceous Layer*	*Remarks*	*pH metre*	B.D.H
1	Plateau	*Acer*	*H. mollis*	Wood margin	3·78	6·5
2	Crest of slope	*Quercus*	*Pteridium*	Closed canopy	3·40	6·0
3	Slope	*Fagus & Acer*	*H. mollis*	do.	3·70	6·25
4	Local plateau	do.	*Holcus & Scilla*	do.	3·30	5·0
5	Local depression	*Quercus*	do.	do.	3·48	4·5
6	Swamp	*Fraxinus*	*Claytonia*	Partly open	4·31	7·0
7	Plateau	*Fagus*	Mosses and Liverworts	Closed canopy	4·11	5·5
8	Alluvial bank in streamside	*Fagus*	No vegetation	do.	6·34	8·0

Correlation between slope and *p*H is shown by the graph.



These sets of new figures support Mr. Smith's comments as to the highness of the original figures, but whilst they show only too well how divergent are the actual readings obtained by the two methods, they indicate the utility of the colorimetric method for purely qualitative work.

H. TORDOFF, E. DEARING.

The Naturalist

W. G. BRAMLEY

THE Autumn Foray at Austwick was held a week earlier than usual (September 23rd to 27th) and so followed immediately after the B.M.S. foray. The result was a considerable drop in numbers and only twelve members and friends assembled at headquarters. A few members of the Austwick Field Club attended the excursions and we were ably led by Mr. Cheetham and Miss Mattinson, to whom our thanks are especially due.

With the absence of all our southern friends several sections received very little attention, the Pyreno- and Hyphomycetes suffering most. These would in all probability not have been numerous as there was very little dead wood lying about. Agarics received the most attention and were in much greater quantity than those of us who came from the arid plain of York expected. As there was no expert present several parcels were sent to Miss Wakefield and we are much indebted to her for her help. Even so a considerable number of the smaller things inevitably went unnamed.

A feature of the open parts of Oxenber and Wharfe Woods was the quantity of *Psalliota sylvatica* which is much appreciated by some of the more knowledgable residents. *P. campestris* and *P. arvensis* were also abundant in the fields and were to be seen offered for sale by the roadside and had been so for several weeks.

Ingleborough Hall woods at Clapham and Beezley Glen at Ingleton yielded several species of *Boletus*, some of them in considerable quantity. *Russula nigricans* was also abundant, but most of it old. Both species of *Nyctalis* were present on it in considerable quantity, and no member had ever seen it in such profusion.

A feature of a small area of Ingleborough Hall woods was the prevalence of *Cordyceps capitata*. Whilst a collection of these was being made together with the host, some half-dozen specimens of the proliferous-stemmed *Collybia racemosa* were discovered and a good deal of speculation was indulged in before their identity was established. These specimens ultimately found their way to the Universities of Leeds and Manchester.

Clitopilus prunulus also occurred in greater quantity than anyone present had seen before, while on the contrary only one group of three specimens of *Armillaria mellea* and a single specimen of *Amanita muscaria* were observed. Although *Amanitopsis fulva* was present in some abundance not a single specimen of *A. vaginata* was seen.

Three specimens from Ingleborough Hall caused a lot of trouble before they were finally tracked down to *Pleurotus fimbriatus* (Bolt.) Fr. Miss Wakefield, to whom specimens were submitted, says, ' Both Pearson and Pilat say (it) is a form of *P. lignatilis* Fr. It is exactly like Bolton's figure.'

The Polyporaceae were, as the list shows, extremely scarce (none of the larger species were seen) and in each case were in a resupinate condition. One not listed Miss Wakefield thinks may be this condition of *P. amorphus* Fr.

Puffballs also were not in great numbers and two uncommon ones were nearly overlooked. They may be more widely distributed and have been passed over for old rain-washed *L. perlatum*. This would have happened in the present instance if the extremely light colour of the gleba had not been noticed.

The compiler is greatly indebted to Miss Wakefield and Dr. Dennis, of Kew, for their willing help with the Agarics and Discomycetes, to Miss Grainger for preparing the list of Agarics, to Messrs. Broadbent and Collinge for the list of Myxomycetes, and finally to the Chairman and Mr. Hincks for their help at the foray and the efficiency with which they kept the recorder awake and working till the small hours of the morning.

A. = Austwick. AM. = Austwick Moss.
C. = Clapham W. = Oxenber and Wharfe Wood.
I. = Beezley Glen, Ingleton.

* Not in Mason & Grainger's *Catalogue of Yorkshire Fungi* for V.C. 64.
† Not in Mason & Grainger's *Catalogue of Yorkshire Fungi* for Yorkshire.
Yk. = Specimens deposited in Herb. Yorkshire Philosophical Society.

MYXOMYCETES

Physarum nutans Pers., I.A.
Comatricha nigra Schroet., W.
Lycogala epidendrum Fr., AM.
Trichia scabra Rost., W.
T. varia Pers., W.
Arcyria cinerea Pers., W.
A. denudata Sheldon, C.I.

PHYCOMYCETES

Cystopus candidus (Pers.) de Bary, on *Capsella*, W.

Phytophthora infestans (Mont.) de Bary, W.

Plasmopara pusilla (de Bary) Schroet., W.A.

Protomyces macrosporus Unger, on *Aegopodium*, A. (Yk.)

ASCOMYCETES

PLECTASCALES

Onygena equina Willd., on owl pellet, C.

Elaphomyces granulatus Fr., C.

ERYSIPHALES

**Erysiphe galeopsidis* DC., on *Stachys sp.*, A.

E. graminis DC., on *Dactylis* and *Agropyron*, A.

E. polygoni DC., on *Brassica napa*, *Arctium*, *Anthriscus*, *Heracleum* and *Symphytum*, A.C.I.

DISCOMYCETES

Coryne sarcoides (Jacq.) Tul., W.C.

**Helotium epiphyllum* (Pers.) Fr., I. (Yk.)

H. fructigenum (Bull.) Fckl., W. (Yk.)

H. vitellinum Rehm., AM. on *Spiraea*, (Yk.) (Dr. Dennis says this is probably only a colour form of *H. scutula* (Pers.) Karst. from which it is microscopically indistinguishable.)

Leotia lubrica (Scop.) Fr., C. (Yk.)

Macropodia macropus (Pers.) Fckl., C. (Yk.)

Mollisia cinerea (Batsch) Fr., W.C.

Polydesmia pruinosum (B. & Br.) Boud., A.

Pseudopeziza trifolii (Biv.-Bern.) Fckl., A.

†*Pyrenoeziza digitalina* (Phill.) Sacc. (*certe* W. D. Graddon), on *Digitalis*, I. (Yk.)

Trichoscypha calycina Schum. sensu Fckl., C.

Trochila craterium (DC.) Fr., on *Hedera* leaves, W. (Yk.)

Tympanis conspersa Fr., on *Sorbus*, C. (Yk.)

PYRENOMYCETES

HYPOCREALES

Cordyceps capitata Fr., C. (Yk.)

Dialonectria peziza (Tode) Cke., on *Polyporus squamosus*, C. (Yk.)

Hypocrea pulvinata Fckl., W.

Nectria cinnabarina (Tode) Fr., AM.

SPHAERIALES

†*Anthostoma gastrinum* (Fr.) Nits., on *Ulmus*, AM.

**A. turgidum* (Pers.) Nits., on *Fagus*, C.

Diatrype disciformis (Hoffm.) Fr., on *Fagus*, C.

D. stigma (Hoffm.) Fr., A.

Diatrypella favacea (Fr.) Ces. & de Not., on *Betula*, W. *Corylus*., W. *Alnus*, AM.

Hypoxylon coccineum Bull., on *Fagus*, C.

H. fuscum (Pers.) Fr., on *Corylus*, W. On *Alnus*, A. (Yk.)

H. serpens (Pers.) Fr., on *Fagus*, C. (Yk.)

Leptosphaeria acuta (M. & N.) Karst., on *Urtica*, A.

Melanconis alni Tul., on *Alnus*, A. (Yk.)

M. stilbostoma (Fr.) Tul., on *Betula*, W.

Quaternaria quaternata (Pers.) Tul., on *Fagus*, C.

Stigmatea robertiani (Fr.) Fr., W.A.

Valsa ambiens (Pers.) Fr., on *Crataegus*, W. On *Fagus*, C.

Xylaria hypoxylon (Linn.) Fr., W.

X. polymorpha (Pers.) Grev., C.

BASIDIOMYCETES

USTILAGINALES

Urocystis agropyri (Preuss) Schroet., on *Agropyron repens*, A.

U. anemones (Pers.) Wint., on *Ranunculus repens*, A.

UREDINALES

Coleosporium petasites Lev., II, III on *Petasites*, A.C.
C. senecionis (Pers.) Fr., II, III on *S. vulgaris*, A.I.
C. tussilaginis Tul., II, III on *T. Farfara*, A.C.I.
Melampsora sp., II on *Salix aurita*, W. (Yk. and W.G.B.)
M. rostrupii Wagn., II on *Populus tremula*, II. (Yk. and W.G.B.)
Melampsoridium betulinum (Pers.) Kleb., II on *Betula*, W.
Pucciniastrum circaeae (Schum.) Speg., II on *C. lutetiana*, C.
**Puccinia acetosae* (Schum.) Koern., II on *R. acetosa*, W.I.
P. antirrhini Ditt., II, III on *A. majus*, A.
P. caricis (Schum.) Reb., II on *C. flacca* Schreb., I. (W.G.B.)
P. centaurea DC., II, III on *C. nigra*, A.I.
P. cirsii Lasch., II, III on *C. palustre*, AM.
**P. glechomatis* DC., A.
P. hypochoeridis Oud., II, III on *H. radicata*, Horton-in-Ribblesdale.
Puccinia lapsanae Fckl., II, III. A.
P. lolii Niels., II, III on *Arrhenatherum, Holcus, Lolium.* A.I ; on *Agrostis sp.*, AM.
P. menthae Pers., II, III on *M. aquatica*, AM. *M. piperita*, Lawkland Moss. *M. viridis*, A.
†*P. mirabilissima* Peck., II, III on *Mahonia aquifolia*, A.
P. obtegens Tul., II, III. A.AM.C.
P obscura Schroet., II on *Luzula sp.*, I.
P. phragmitis (Schum.) Koern., II, III. AM.
P. polygoni-bistortae Kleb., II, III. A.
P. taraxaci Plowr., II III. A.
P. violae (Schum.) DC., II, III on *V. Riviniana*, C.I.
†*Thecopsora galii* de Toni, II on *Galium verum*, Horton - in - Ribblesdale. (W.G.B.)
Uromyces fabae (Pers.) de Bary, II, III on *Vicia sepium*, W. (W.G.B).
U. geranii Otth., III on *G. pratense*, A.
U. rumicis (Schum.) Wint., II, III on *R. obtusifolius*, A.

AGARICALES

Amanita muscaria (Linn.) Fr., A.
A. rubescens (Pers.) Fr., C.
Amanitopsis fulva (Grev.) Rea, W.
Lepiota granulosa (Batsch) Fr. (sensu Lange), I.
L. cristata (A. & S.) Fr., W.I.
L. fusco-vinacea Moller & Lange, W.
Armillaria mellea (Vahl.) Fr., C.
Tricholoma resplendens Fr., I.
T. fulvum Fr., W.I.
Clitocybe aurantiaca (Wulf.) Studer, A.
C. aurantiaca var. *albida* Gillet, AM.
Laccaria laccata (Scop.) B. & Br., W C.
L. amethystina (Vaill.) Cke., C.
Mycena galopus (Pers.) Fr., W.
M sanguinolenta (A. & S.) Fr., C.
M. pura (Pers.) Fr., C.
M. acicula (Schaeff.) Fr., C.
M. ammoniaca Fr., W.
M. polygramma (Bull.) Fr., W.
Collybia radicata (Relh.) Berk., C.
**C. racemosa* (Pers.) Fr., C.
C. maculata (A. & S.) Fr., W.
Marasmius dryophilus var. *aquosus* (Fr.) Rea, I.
M. androsaceus (Linn.) Fr., C.
M. rotula (Scop.) Fr., W.
**Pleurotus lignatilis* Fr., (=*fimbriatus* (Bolt.) Fr.) C.
P. septicus Fr., W.
Lentinus vulpinus (Sow.) Fr., AM.
Nyctalis parasitica (Bull.) Fr., I. (on *R. adusta* and *R. nigricans*).
N. asterophora Fr., I. (on *R. nigricans*).
Hygrophorus eburneus (Bull.) Fr., C.
H. pratensis (Pers.) Fr., W.I.
H. virgineus (Wulf.) Fr., W.
H. conicus Fr., W.I.
H. calyptraeformis Berk., W.A.
H. puniceus Fr., A.
H. psittacinus (Schaeff.) Fr., W.I.
H. citrinus Rea, A.
H. chlorophanus Fr., A.
H. laetus (Pers.) Fr., W.
H. unguinosus Fr., W.
Lactarius plumbeus Fr., W.I.
L. blennius Fr., W.
L. pallidus (Pers.) Fr., W.
L. vellereus Fr., W.
L. camphoratus (Bull.) Fr., I.
L. quietus Fr., W.I
L. rufus (Scop.) Fr., W.
L. subdulcis (Pers.) Fr., W.I.
Russula nigricans Fr., W.I.
R. adusta Fr., C.I.
R. cyanoxantha (Schaeff.) Fr., W.I. (typical and several specimens of green form).
R. fellea Fr. C.I.
R. atro-purpurea Krombh., I.
R. ochroleuca Fr., W.I.
Clitopilus prunulus (Scop.) Fr., W.C.

AGARICALES *continued.*

Entoloma porphyrophaeum Fr., W.I.
†*E. nitidum* Quél., I.
E. ardosiacum (Bull.) Fr., W.
E. rhodopolium Fr., W.
Leptonia lampropus Fr., A.
Nolanea mammosa (Linn.) Fr. sensu Lange, A.
Pholiota mutabilis (Schaeff.) Fr., W.
Galera tenera (Schaeff.) Fr., W.
Cortinarius (*Tela*) *palaeaceus* Fr., C.I.
**C.* (*Hydro*) *erythrinus* Fr., W.
Inocybe fastigiata (Schaeff.) Fr., C.
I. pyriodora (Pers.) Fr., C.
I. geophylla (Sow.) Fr. var. *lilacina* Fr., C.
I. asterospora Quél., C.
†*I. umbrina* Bres., C.
I. scabella Fr. sensu Cke., A.
Paxillus involutus (Batsch) Fr., W.
Stropharia semiglobata (Batsch) Fr., W.I.C.A.
Hypholoma velutinum (Pers.) Fr., W.I.
Psilocybe ericaea (Pers.) Fr., W.
Psathyrella disseminata (Pers.) Fr., C.A.
Panaeolus papilionaceus (Bull.) Fr., W.
P. campanulatus (Linn.) Fr., W.I.
Annellaria semi-ovata (Sow. ex Fr.) Pearson & Dennis, W.
Psalliota arvensis (Schaeff.) Fr., A.
P. campestris (Linn.) Fr., C.AM.
P. sylvatica (Schaeff.) Fr., W.
Coprinus niveus (Pers.) Fr., W.I.
C. micaceus (Bull.) Fr., A.
C. atramentarius (Bull.) Fr., A.
Gomphidius rutilus (Schaeff.) Fr., A.

BOLETALES

Gyroporus castaneus (Bull.) Quél., C.
Boletus edulis (Bull.) Fr., I.
B. luridus (Schaeff.) Fr., C.
**B. calopus* Fr., I.
B. elegans (Schum.) Fr., I.
B. viscidus (Linn.) Fr., A.
B. piperatus (Linn.) Fr., W.
Boletus subtomentosus (Schaeff.) Fr., W.C.
B. badius Fr., C.I.
B. scaber (Bull.) Krombh., W.
B. chrysenteron (Bull.) Fr., W.C.
(*B. pruinatus* Fr., I. (or perhaps a dark form of *chrysenteron*. E.M.W.))

APHYLLOPHORALES

Polyporus chioneus Fr., (=*P. semipileatus* Peck. sec Pilat) A. (Yk.)
Irpex obliquus (Schrad.) Fr., W.C.I.
†*Odontia bicolor* (A. & S.) Fr., on conifer, C. (Yk.)
O. arguta (Fr.) Quél., W. (Yk.)
Stereum spadiceum Fr., W.C.
Hymenochaete corrugata (Fr.) Lev., on *Corylus*, W. (Yk.)
Corticium albostramineum (Bres.) Wakef., AM. (Yk.)
(=*C. punctulatum* Cke. sec Rogers & Jackson)
C. lividum Pers., C. (Yk.)
**C. microsporum* (Karst.) B. & G., C. (Yk.)
C. sambuci (Pers.) Fr., A.
†*Pelicularia isabellina* (Fr.) Rogers, W. (Yk.)

GASTEROMYCETALES

**Lycoperdon depressum* Bon., C. (Yk.)
†*L. velatum* Vitt., C. (Yk.)
Lycoperdon pyriforme (Schaeff.) Pers., A.

FUNGI IMPERFECTI

**Darluca filum* (Bivon.) Cast., A.C.I.
†*Papularia sphaerosperma* (Pers.) v. Hohn., on *Bambusa*. C. (Yk.)
Polythrincium trifolii Kunze, W.
Torula herbarum Link, I.
Trichoderma lignorum (Tode) Harz, W.C.

ADDENDA

DISCOMYCETES

†*Mollisia caespiticia* Karst., on *Betula*, AM. (Yk.)
Probably new to Britain. Det Dr. Dennis and W D. Graddon.
†*Trichophaea* (*Lachner*) *Bulbo-crinita* (Phill.)., Boud.,
on *Betula* bark, W. (Yk.) Dr. Dennis says this is not known at Kew but agrees with Massee's description. It is very near to *T. woolhopeia* which is given as growing on the ground.

BOOK REVIEWS

British Waders in their Haunts, by **S. Bayliss Smith.** Pp. 162, with 79 photographic illustrations, and three pages of drawings by B. Laker of Waders in flight. G. Bell and Sons, Ltd., 21/-.

The introductory chapters of this book are historical and descriptive of 'estuary photography,' after which the author describes day and night experiences and observations from autumn to spring watching waders on the estuarial coasts, mainly of Sussex and Cheshire. He then proceeds to give his impressions of the members of the wading family in detail, including the British breeders, sometimes bracketting related species, but dealing faithfully with all, even finding a few lines for the occasional wanderers. To supplement his own considerable experience, he has widely read the writings of others.

To all whose knowledge of wading birds is not extensive and who desire to improve it this book will prove very helpful, while the vivid descriptive matter and good photography excellently reproduced, will give pleasure to those already familiar with this great group of birds.

A pleasing nicety in the choice of words is often displayed. 'A shimmering cascade of birds'—how well the phrase fits the descent to mud of a thousand Dunlins at the end of their wheeling flight. Very occasionally a word is less exactly right,' may' or 'might,' or 'could' would qualify the verbs used more accurately than 'must' or 'would' in the sentences relating to the Ruff in its breeding haunts which are far from confined to Holland; and to the surmised, possible, autumnal journey of a Little Stint

Many of the author's photographs are recognisable as from Hilbre Island, others were taken in Sussex. The shelving rocks of Hilbre are becoming as familiar in photographs of wading birds as the rounded rocks of Scilly have long been in photographs of gulls and other sea-birds. Perhaps the author rather underestimates the many who have long known the charm of watching waders at close quarters along estuarial tide-lines. His debt to the observations of others, as indeed he acknowledges, is not confined to the supplement, where 21 pages, closely printed, present details of plumage, measurement, colouration and habits of 36 species, summarised from *Handbook* and other sources.

The distribution maps (12 on one page) are too small for their derivatory method. To shade a whole vice-county on the strength of the occurrence in it of a scattered breeding pair or two, with the same intensity as is applied to the areas where the species breeds commonly, is to present a false picture, noticeable here with at least three species.

R.C.

Indian Hill Birds, by **Sàlim Ali.** Pp. lii+188, with 64 coloured plates and 8 photographs Geoffrey Cumberlege, Oxford University Press, 30/-.

A Bird Photographer in India, by **E. H. N. Lowther.** Pp. xii+150, with 78 photographic plates. Geoffrey Cumberlege, Oxford University Press, 21/-.

As a contrast to the spate of books published on the birds of Britain, many of which are repetitive and unnecessary, it is a pleasure to note the appearance of two books on the birds of India, both of which meet a decided need and both of which, in their different ways, are first class.

Mr. Sálim Ali's intention has been to provide a handy book that would tell holiday visitors to the hills, by simple word and picture, something of the birds they meet. In this he has admirably succeeded. His descriptions are short but clear; his account of the birds' habits vivid and readable. He has not included all the birds it is possible to see in the hills: even if space did not allow an account of the species that occur more seldom, a list of these in the form of an appendix might have been useful. The book contains a sensible short introductory essay, a key to distribution and an identification key. The last, in the opinion of the reviewer, is of less use; observers who rely on such aids are unlikely ever to identify birds expertly. The plates, from paintings by G. M. Henry, are of outstanding merit. The colours, however, are in a few cases distorted, perhaps in process of reproduction. It is also strange to see the Red-breasted Flycatcher shown with a white rump. But the work should prove indispensable to those for whom it is intended.

In Mr. Lowther's book the photographs are the main *raison d'être*, and magnificent they are; magnificent is the only word. They represent the photographer's

life work and the variety of species portrayed is astonishing. The sequences of pictures of the Crested Swift and Grey Hornbill, and the studies of different species of stork, are of particular interest; and there are particularly fine portraits of the Little Pratincole and the Brown Fish Owl, like a great angry cat with ears depressed. Nor is the letterpress negligible : it is true that Mr. Lowther's style tends to officialese (he will say ' prior and subsequent to ' instead of ' before and after '), but his enthusiasm makes him very readable. The chapter on ' An Indian River Bed ' will awake nostalgic feelings in anyone who has had experiences similar to his and, if the extract from his notebooks describing the evening song of Nightjars is typical, it is a pity he did not include more material from the same source. Scientific names are not used, perhaps regrettably, since many of the species dealt with have other English names outside India : for example, it would be of interest to a reader in Africa to recognise the Nukhta or the Little Brown Dove as species which are familiar to him under different names. The most valuable chapter is that on Hornbills, dealing with the walling-up of the female in the nest cavity and the methods of feeding her adopted by the male. The book is filled with the writer's pleasant personality and the present reviewer was at the very start prejudiced in his favour by the dedication, to the two Indian shikaris who helped him in his work. ' Anecdotal ' bird books are not at present fashionable, but would there were more of this type.

The Oxford University Press is to be congratulated on the attractive production of both books.

M.F.M.M.

Bird Watching and Bird Behaviour, by **Julian Huxley.** Pp. xii+116, with 8 photographic plates. Dennis Dobson, Ltd., 6/-.

Ants, by **Julian Huxley.** Pp. viii+150, with 8 plates. Dennis Dobson, Ltd., 6/-.

Both of these books were originally published many years ago and are now reprinted without change. The first represents the substance of six broadcast talks given in 1930. It has lost none of its original appeal for it gives sufficient insight into the attractions of bird-watching to stimulate the uninitiated and earn the approval of the converted. Though many of the observations recounted are drawn from abroad much can be paralleled amongst our own birds and the book outlines some of the problems of bird behaviour still to be solved.

As a short survey of the biology of ants and termites, Dr. Huxley's book is unsurpassed. It outlines with a skill which does justice to the fascination of the subject, the social structure and the many remarkable specialisations in the ways of life adopted by different species. This has been done many times before but the special merit of this book is the effectiveness with which Dr. Huxley points out the fallacies into which so many writers on social insects have fallen in drawing comparisons between human societies and social organisations in insects.

The Geology of Lincolnshire, by **H. H. Swinnerton** and **P. E. Kent,** Lincolnshire Natural History Brochure No. 1. Pp. 126, with one plate and 22 figs. Lincolnshire Naturalists' Union, City and County Museum, Lincoln, 5/-.

While not *terra incognita,* Lincolnshire has been singularly neglected by geologists, compared with the neighbouring counties. Although exhibiting a relatively simple structure reflected in a subdued topography, the county has been shown, by recent borings in search for oil, to have an interesting deep-seated structure and these investigations have led to attention being paid to the higher strata.

To remedy the lack of comprehensive accounts of the natural history of the county, the Lincolnshire Naturalists' Union has undertaken the production of a series of brochures, the first of which, here reviewed, has been placed in the capable hands of Professor Swinnerton and Dr. Kent, both of whom have made important original contributions to the geology of the county. After an introductory explanation of geological terms for the benefit of the general reader, the successive formations are described in historical order and suitable diagrams demonstrate the facies variation which many of the formations conspicuously show. The appetite of the fossil collector is whetted by simple descriptions of species and details of likely localities while the special evolutionary significance of some of the fossils is discussed.

Many interesting details of topography, such as river captures, the effects of glaciation and the problems, peculiar to Lincolnshire, of the marshlands and fenlands are clearly and concisely described. The structure of the old foundation rocks as well as that of the Jurassic and Cretaceous formations are effectively summarised by structure-contour diagrams.

The object of the series will be served if some at least of the many suggestions for further investigation and research are taken up by local geologists. A final chapter outlining the chief personalities who have helped in the past to build up the knowledge of Lincolnshire geology described in the brochure completes an excellent, well-balanced production appearing at an opportune time. Its price should ensure its being in the hands of every naturalist and geologist interested in Lincolnshire.

H.C.V.

Geology of Central Ayrshire, by **V. A. Eyles, J. B. Simpson** and **A. G. MacGregor.** Mem. Geol. Surv., Scotland. Pp. 160, with 8 plates. H.M. Stationery Office, 7/6.

This memoir records work which was ready for publication in 1939 and no attempt has been made to bring it up to date. Nevertheless it represents a valuable summary of an area which is full of problems, stratigraphical, petrographical and economic. The strata range from Ordovician to Permian and igneous rocks belonging to many episodes are exposed in sills, dykes and lava-flows. Yorkshire readers will be interested in the description of the Cleveland Dyke where it crosses the area. The memoir is clearly written and well illustrated by plates and diagrams including useful sketch maps, some of which include ground which does not occur in Sheet 14. H. C. V.

The Limestones of Scotland. Memoirs of the Geological Survey. Special Reports on the Mineral Resources of Great Britain, Vol. XXXV, by **T. Robertson, J. B. Simpson** and **J. G. C. Anderson,** with contributions by **D. Haldane** and **J. Knox.** Pp. 221, with 7 plates and 43 text figures. H.M. Stationery Office, 17/6.

Early in the war it became apparent that local Scottish supplies of limestone for agricultural and other purposes would be invaluable, and a re-examination of all the limestone resources of the country was at once pressed forward. A series of pamphlets was issued giving detailed accounts of the character, occurrence, distribution and accessibility of every limestone of possible economic value throughout the country. This book gives a more general geological account of the Scottish limestones based on the data then assembled. There are chapters on stratigraphical distribution, economic uses and the lithological and chemical characteristics of the various types of lime-containing rocks and shell sands, followed by a detailed description of their distribution and nature arranged on a county basis. To the botanist as well as the geologist this account of the Scottish limestones will be a most useful and convenient source of information.

The Observer's Book of British Geology, by **I. O. Evans.** Foreword by Prof. H. L. Hawkins. Pp. 266, with 12 colour plates and 170 illustrations in black and white. Frederick Warne & Co., Ltd., 5/-.

This new volume in the ' Observer's Books ' series seeks to fill a long-felt want for a field book of British geology for the beginner, but whether it will satisfactorily fulfil its purpose is of some doubt. Surely the object of this series is an emphasis on what the observer will see, rather than might see. As it is, the book is crammed with interesting facts many of which, however, could safely have been omitted and replaced by more drawings or photographs of some of the commoner fossils. One feels that the author has included everything that came to his mind for fear lest he be accused of omitting some point. References to A ' Pious ' Fraud, the Loch Ness Monster and the use of cuttlefish bone for cage-birds may make interesting reading, but why is precious space wasted on such topics? This is not British geology ! The book is well illustrated, apart from one or two poorly-reproduced colour plates. But the observer will have thoroughly to familiarise himself with the contents before going into the field, and it is here that one feels the volume is not succeeding in its object.

S.W.

Anatomy and Construction of the Human Figure, by **C. E. Bradbury.** Pp. 198, with 26 pages of plates in colour and over 150 illustrations in charcoal. McGraw Hill, 85/-.

This beautifully illustrated and handsomely produced book by a professional—and professorial—artist is designed for art students and teachers, practicing artists, illustrators and sculptors. Starting from the accepted viewpoint that a proper understanding of skeletal construction and musculature as affecting the external form of the human figure is an indispensable prerequisite to its faithful representation, the book provides this information in some detail and with copious illustrations. But it is essentially a practical book. It combines factual information with directions for what to look for, how to emphasise significant features and how to construct form both *in toto* and part by part ; at the same time the author never loses sight of the creative element necessary to the artist.

The publisher's claim that the approach of this book to its subject ' is unique in the field of art and it represents a distinguished contribution to the literature of life drawings for artists ' is fully justified. It is indeed a book which can be unreservedly recommended for it is conspicuously successful in achieving precisely what it sets out to do. One's only regret is that its high price will put it beyond the means of many for whom it is intended.

A.P.

String Lug The Fox, by **David Stephen.** Pp. 224, with 12 illustrations by Nina Scott Langley. Lutterworth Press, 10/6.

In this first book by a Scotsman who ' became seriously interested in foxes when living in Spain ' and has been ' mixed up with them ever since ' is added yet another to the family of Fictional Foxes. Like most of his brethren whose biographies are portrayed, String Lug survives to the end a hectic onslaught of perils which a normal fox could survive only by their avoidance. To quote once more from the dust-jacket, ' he lives through a moor fire and a hard winter ; he fights dogs, weasels and others ; his mate is killed ' but to these must be added traps, a super cat, poison, a Home Guard with a .303, irate farmers with shot guns, other foxes, an adder, a roebuck and a German bomb. To this life packed with incident—which should make the Leicestershire foxes sleep smug in their lairs—String Lug responds with a degree of human prescience exceeded only by that of Jock Simpson, a countryman knowledgable about foxes, who on several occasions joins in attempts to encompass the death of our vulpine hero but who, when the beast is at last at his mercy, sentimentally abstains from making his quietus.

The narrative is readable though passages such as ' The clack of a jackdaw slapped the morning in the face ' strain harshly after effect. The author has borrowed much but not enough from Williamson and the outcome is a book which may delight the sentimental but which, making all allowances for dramatisation, is not natural history.

E. H.

The Passions of the Wild, by **W. R. Calvert.** Pp. 189, with 16 full-page photographs. Rich and Cowan, 10/6.

This is a reprint of a book which was first published in 1936. It is unfortunate that much good natural history is marred by an overdose of ' passions.' Along with this goes an extravagance of description which makes the reader long for a good honest crag rather than the inevitable ' upflung peak.' There is much that is enjoyable in the description of wild life in the fells, but a simpler treatment of the background and events would have been more effective. The book is illustrated by some excellent photographs—those of the weasel and sparrow-hawk in particular—and in spite of its defects the reader is left with a longing for the opportunity to follow the rovings of the principal characters.

J.H.E.

Directory of Natural History Societies : First Supplement, by **H. K. Airy Shaw.** Pp. 44. Amateur Entomologists' Society, 1 West Ham Lane, E.15, 2/-.

This pamphlet follows the plan of the original directory published in 1948 and gives new or amplified and corrected information referring to existing and defunct natural history societies throughout Britain. It is the first of several annual supplements which it is proposed to issue prior to the preparation of a new edition.

505.42

YORKSHIRE NATURALISTS' UNION

COMMITTEE FOR ORNITHOLOGY

REPORT FOR 1949

EDITED BY
RALPH CHISLETT, M.B.O.U.

Supplement to the April-June, 1950
issue of "The Naturalist"
(not supplied separately)

A. BROWN & SONS, LIMITED
32 BROOKE STREET, LONDON, E.C.1
AND AT HULL

THE SPURN BIRD OBSERVATORY

Naturalists wishing to use the Warren Cottage should apply to the Hon. Secretary (G. H. Ainsworth, 144 Gillshill Road, Hull—Tel. 24085) stating the period desired, with possible alternatives.

The charge will be 3/- per night, or one guinea per week per person, payable in advance. Cheques should be payable to The Spurn Bird Observatory and Ringing Sub-Committee, Yorkshire Naturalists' Union. The Hon. Treasurer is C. E. A. Burnham, Carr Hill Lane, Sleights, Whitby.

The Cottage must be left clean and tidy, and breakages made good. Improvements to equipment and repairs to the traps assist maintenance. Keys must be returned to Miss Leonard, Kilnsea Café, on the day of leaving.

Visitors under 18 can only be accepted with an adult present to take responsibility.

Camping tents, caravans, etc., are not permitted.

Ringing. Only the provided rings may be used. Ringing must be supervised by a ringer in charge authorised by the Ringing Committee of the British Trust for Ornithology. All ringings, recoveries, and day-to-day estimates of species noted south of Kilnsea must be recorded in the Committee's books. Birds must not be ringed if the species is in doubt, but must be released.

The Cottage is sited at the Kilnsea end of the Spurn Peninsula ($\frac{1}{4}$-mile from Kilnsea). A bus service runs from Hull, *via* Patrington (nearest railway station, 10 miles from Kilnsea, taxi available).

Most visitors prefer to feed at Miss Leonard's Café, Kilnsea (ten minutes' walk), who should be notified early to facilitate rations. There is a paraffin stove in the Cottage. Crockery, cutlery, kitchen utensils, blankets and bedding are available, but towels, sheets and table linen are not provided. Coal must be used sparingly, and the supply of driftwood maintained.

The peninsula is owned by the War Office, from whom the cottage is leased. The Military authorities have always given generous access to accredited naturalists, but local regulations must be observed.

Entrance to the Camp area is not permitted, and the Point trap must be visited *via* the beach.

No shooting is allowed, and no gun should be brought.

G. H. Ainsworth (*Hon. Secretary*).
R. Chislett (*Chairman*).

YORKSHIRE NATURALISTS' UNION (VERTEBRATE SECTION) COMMITTEE FOR ORNITHOLOGY

Chairman : R. M. Garnett

Recorders :

North Riding—*East* : R. M. Garnett, Thornton-le-Dale.
West : J. P. Utley, B.Sc., M.B.O.U., 24 Neile Close, Romanby, Northallerton.
East Riding : G. H. Ainsworth, 144 Gillshill Road, Hull.
West Riding : R. Chislett, M.B.O.U., Masham.
York District : E. W. Taylor, C.B.E., M.B.O.U., 11 The Avenue, York.

Hon. Secretary and Editor of Records :
Ralph Chislett.

Spurn Bird Observatory Sub-Committee :
R. Chislett (Chairman), R. M. Garnett (Representative to the Bird Observatories Sub-Committee of the B.T.O.), C. E. A. Burnham (Hon. Treasurer), J. Lord, R. F. Dickens, and G. H. Ainsworth (Hon. Secretary).

Report for 1949

The year was mainly fine and dry from the early months until early November, with only a few short showery periods. Water-levels generally became very low, and many streams, springs and reservoirs ran dry. A state of drought persisted through most of the summer and autumn, and not until November did stormy weather begin the process of replenishing depleted water supplies. Waterside birds were affected by the drought considerably, and the storms of late autumn were violent enough to drive such birds as Auks and Divers off the seas.

The Committee has had as active a year as any in its history, with record attendances at its meetings in March and October, with meetings in the county of British Trust for Ornithology Representatives, and of the B.T.O. Bird Observatories Sub-Committee, both of which our representatives attended and addressed. We were represented at all the general meetings of the Union—at field meetings, although numbers may prevent much serious work, I often find members who are glad of help in the identification of bird calls. Individual activities are proved by the mass of notes that reached me for use in the preparation of this report. Collective activities have by no means been confined entirely to work at Spurn.

The Spurn Bird Observatory

(By G. H. Ainsworth and R. Chislett)

The year has been the Observatory's best to date. The objects for which it was inaugurated in November, 1945, are being fulfilled increasingly each year ; as experience shows us—management, members and visitors alike—where improvements in method and equipment can be effected. We are continually striving to improve the design of the trapping-box, and of the traps, to eliminate possible damage to birds. Whilst effectiveness of trapping is often governed by matters outside our control, attention is continually being given to such as are. That we shall ever be able to comply with the wishes of those who would like a north-east wind to be switched on at favourable moments, carefully selected to coincide with the times of their visits, is hardly likely.

Over £40 has been spent on the new trap at the Point. We have extended hospitality to visiting members of the B.T.O. Observatories Sub-Committee, and to those who attended the B.T.O. Representatives' Conference at Bridlington in September, all of whom expressed appreciation. Rent, electricity, fuel, and such small necessities as the washing of blankets, and sundry repairs and renewals, have been met ; but our financial position remains satisfactory.

Students, not always ornithological, from inside and outside the county, are using our facilities to an ever-increasing extent. The Observatory was begun by bird students for bird students, and only such can be accommodated during the main migration periods. With very few exceptions those who have stayed at the cottage have observed the rules meticulously and have added their quotas to the common pool. They have shared the few daily chores, kept their room clean and tidy, have willingly made themselves available for work at either trap, and have joined in the nightly symposium embodied in the ' roll-call ' of birds seen, and in the ' log ' of each day's events. Not that the ' log ' has quite invariably been

MAR 1 8 1950

used as intended. Visitors have been known to display more enthusiasm towards their own notes than towards those of the Observatory. Occasionally the occurrence of quite an unusual, or a difficult, species has been noted by a tick or a figure in the ' roll-call,' with no amplification in the ' logbook.' Modern, scientific sight-recording requires details of the diagnostic features which enabled identification to be certain, and of how much was seen of them. Mention in the ' log ' moreover makes it clear that a tick or a figure has not got into the wrong line or column, which it can do so easily.

The cottage was occupied in the early months for short periods by several people. The arrivals of any spring migrants between March 22nd and April 4th, and between April 9th and 12th, were not observed. Thereafter work was continuous until the end of May, when of passage migrants only stragglers (often interesting) were left. Observation in the autumn was continuous from July 30th until November 5th, whereafter again keen spirits kept watch for periods in mid-November and December. Seventy people stayed at the Observatory during the year for varying periods, long and short, and there were many day visitors.

Our returns of birds ringed are made to Miss Leach for the twelve months to October 31st and we have always thought it advisable, as far as ringed birds are concerned, to use the same date for our own purposes.

In our ringing year to October 31st, 1949, 2,126 birds were ringed, covering 62 species, and ignoring sub-species. This was an enormous increase over the previous year, and mainly but not entirely attributable to the new trap at the Point. At the Warren trap birds ringed totalled 1,048 against last year's total of 763—a handsome increase. But the new trap proved so effective at some periods that by October 31st 1,078 birds had been ringed there. During October it became obvious that the new trap might surpass the old one, as each took the lead in turn in a neck-and-neck race. The Point trap gained considerably on days when strong winds from south and west kept birds away from the Warren bushes, and at the same time tied some to the bushes and seeded plants (sea-rocket, etc.) at the Point, as preferable to the passage to Lincolnshire in a high wind. On some such days, birds such as Fieldfares, Redwings, Greenfinches and Chaffinches could be seen to flock down to the Point, and to change altitude to find a more favourable plane ; and then to make the crossing, whilst others, maybe of the same party, when a hundred yards out over the water, would be persuaded by the wind to swing round and down to the shelter of dunes and bushes.

Concerning some individual species, too, the results at the two traps are interesting to compare. It will be noticed that all the rare warblers caught, including the Greenish Warbler, had been attracted to the cottage bushes ; that a Wryneck and a Woodcock came to each trap ; and that Whinchats preferred the open dunelands at the Point. The Willow-Warbler that already wore a Swedish ring when caught was also driven from the Warren bushes—this was the first of its species to be recaught in Britain after having been ringed abroad. Far more Greenfinches and Chaffinches were attracted by the seeded plants before the Point trap than by the bushes of the Warren trap, but with Blackbirds and Willow-Warblers the positions were reversed. In 1948 the expected invasion of Blackbirds failed to materialise in October—not so in 1949, but Robins and Goldcrests in 1949 never reached the numerical peaks of 1948. It should be stated that at a meeting held at Spurn in September, 1949, the Committee decided against the ringing of any more Goldcrests, in view of the slightly increased weight of the new No. 1 rings.

The two types of work, observational and trapping to ring, necessarily overlap. It is by no means unusual first to learn of the presence of a species on the Peninsula from its appearance in a trapping box at the end of a drive, but for which its presence would never have been suspected. Conversely those of us who rush from one trap to the other, without exploring the intervening bushes and beaches, may miss much that should have been recorded. The Spurn peninsula is large and many-sided for a few people to watch, especially when so much time may be mortgaged by events at one or both of the traps during the busiest seasons. Unless both traps are being worked by separate parties it is probable that neither will do its best in any day. The maximum achieved in a day in 1948 of 57 birds was passed on a number of days in 1949, when the record was 84, with two main traps now being worked.

The Observatory now has a further responsibility—to safeguard the colony of Little Terns that have bred along our peninsula from time immemorial. The responsibility was passed to us by the Wild Birds Protection Acts Committee of the Y.N.U. in March, 1949. The slight improvement in the results of the breeding season that followed was mainly due to week-end patrolling by a few people. It is hoped that volunteers in 1950 will cover each week-end from late May to late July.

Many other matters resulting from the Observatory's work will be found hereafter under the heading of the species concerned in the ' Classified List.' County records are so much more useful and effective when available together in one place, than if students have to seek for them in several places.

Birds Ringed in Year to October 31st, 1949

	Ringed Warren	*Ringed Point*	*Total*
Jackdaw	—	5	5
Magpie	1	—	1
Starling	30	5	35
Greenfinch	26	310	336
Siskin	—	1	1
Linnet	86	69	155
Chaffinch	107	265	372
Brambling	9	53	62
Yellow-Bunting	8	—	8
Reed-Bunting	19	21	40
House-Sparrow	41	9	50
Tree-Sparrow	6	3	9
Skylark	1	—	1
Tree-Pipit	—	1	1
Meadow-Pipit	7	20	27
Yellow Wagtail	4	—	4
Pied Wagtail	—	2	2
Great-Tit	7	—	7
Blue-Tit	19	5	24
Long-tailed Tit	1	—	1
Spotted Flycatcher	8	2	10
Pied Flycatcher	58	20	78
Red-breasted Flycatcher	1	—	1
Goldcrest	16	1	17
Chiffchaff	6	3	9
Willow-Warbler (including Northerns)	119	41	160
Greenish Warbler	1	—	1
Wood Warbler	1	—	1
Yellow-browed Warbler	1	—	1
Sedge-Warbler	25	3	28
Barred Warbler	1	—	1
Garden Warbler	13	2	15
Carried up	622	841	1463
Brought forward	622	841	1463
Blackcap	1	—	1
Whitethroat	35	31	66
Lesser Whitethroat (including 1 Siberian)	3	1	4
Fieldfare	—	2	2
Song-Thrush	47	11	58
Redwing	6	3	9
Blackbird	176	76	252
Wheatear	9	6	15
Whinchat	4	35	39
Redstart	38	26	64
Black Redstart	3	2	5
Nightingale	—	1	1
Robin	43	6	49
Hedge-Sparrow	18	9	27
Wren	4	1	5
Swallow	8	—	8
Sand-Martin	2	—	2
Swift	—	1	1
Wryneck	1	1	2
Cuckoo	8	3	11
Merlin	1	—	1
Kestrel	2	—	2
Sparrowhawk	3	2	5
Woodcock	1	1	2
Redshank (young)	4	—	4
Dunlin	2	—	2
Ringed Plover (young)	2	3	5
Little Tern (do)	2	16	18
Guillemot	1	—	1
Common Partridge	2	—	2
	1048	1078	2126

Many people have helped us with gifts and services. The useful little library grows. The set of volumes of *The Naturalist* have been skilfully bound by Mr. P. L. Gravett. Kindly consideration and help have been shown by our landlords—the W. D. Northern Command at York, and by those concerned with the administration of the Spurn Defence Works. To those and to all others who have helped on our work we tender the Committee's thanks. As the result of that help, and our own efforts, we have provided students from near and far with opportunities they have needed ; and we are accumulating data, year by year, for a worth-while contribution to the scientific knowledge of bird migration as it affects Yorkshire—and elsewhere.

The High Royd Ringing Trap

Highly useful work has long been expected from the ' Halifax Zoological Group,' the members of which, after having inspired an active Junior Group, now become

merged with the Halifax Scientific Society. Very recent work in the Halifax area concerned with a Desert Wheatear (see 'Classified List') provides a perfect example of the value of youthful energy helped by mature experience.

G. R. Edwards and his helpers are to be congratulated on the contribution they have made to our knowledge of the migration of the Pied Wagtail, now extended by recoveries of birds ringed at High Royd, and to a smaller extent of other species.

One of a number of Hedge-Sparrows trapped in August that were afflicted in varying degrees with swollen feet, and growths on ankle joints, and over both eyes, was recaptured on December 18th and was found to have recovered perfect health—when originally trapped its state was very bad.

Blackflies infesting a clump of bulrushes apparently attracted the attentions of several Blue-Tits, two Willow-Warblers, a juvenile Sedge-Warbler, and a juvenile Whinchat on September 18th, 1949; and of two Spotted Flycatchers and three young Whinchats a few days later.

Fewer birds were ringed in 1949 than in the previous year, mainly because of a difficulty in manning the trap in spring. The list was as follows:—Magpie, 1; Chaffinch, 27; Yellow Bunting, 2; Tree-Sparrow, 2; Meadow-Pipit, 15; Grey Wagtail, 5; Pied Wagtail, 99; Great-Tit, 14; Blue-Tit, 40; Chiffchaff, 2; Willow-Warbler, 90; Whitethroat, 3; Song-Thrush, 1; Blackbird, 6; Hedge-sparrow, 19; Redstart, 3; Robin, 7; Wren, 8; Snipe, 3; Common Sandpiper, 7; Lapwing (chick), 1; Moorhen, 6.

Several items are included in the 'Classified List.'

Nesting Boxes in the Forests of N. E. Yorkshire

This work has been continued by R. M. Garnett, with the help of A. H. White.

A second consecutive mild winter helped to conserve the numbers of resident birds, and Blue-Tits for the first time outnumbered Pied Flycatchers, taking more readily to boxes in pure conifer plantations—a satisfactory trend. Clutches and broods of both residents and summer visitors have been smaller.

The number of boxes was increased by 96 of which 41 in a new area produced so little that the area is not included in the summary of results. Again it was shown that new boxes produce immediate results only if put into an area where existing boxes have already been occupied; in a new area results are negligible until at least one season has passed.

Of the 255 boxes included in the summary below, 49·4% were occupied, a large increase over 1948, of which 126 boxes resident species occupied 67·5% (Great, Blue, and Coal Tits and one Robin). Summer visitors (Pied Flycatchers and Redstarts) occupied 27·0%. The remaining 5·5% were spoiled by human interference, this being the first year when such pilfering has taken place. 409 white celluloid rings were used to mark birds in one large area, and in another well-populated forest 114 birds were marked with numbered rings as issued by the British Trust for Ornithology.

One female Pied Flycatcher in one forest carried a yellow ring of 1947, and two carried red rings of 1948. A Coal-Tit of 1948 was seen in winter not far from where it had been ringed.

Since addled eggs, or small dead young, may be removed by parent birds, and so disturb the basis of reconstruction of clutch size from brood size plus any remaining eggs, the following figures are considered to be useful only for comparison with other years.

	Average clutch size	*Average brood size*
Great-Tit ...	24 nests 8·14	15 nests 7·95
Blue-Tit ...	48 ,, 9·12	55 ,, 8·78
Coal-Tit... ...	4 ,, 7·75	5 ,, 7·80
Pied Flycatcher	17 ,, 6·55	25 ,, 6·20
Redstart ...	1 ,, 6·00	4 ,, 7·00

The names of species included in the 'Classified List' are preceded by the numbers of Witherby's *Check List of British Birds*.

Among occurrences of special interest may be mentioned the Red-breasted Flycatcher, Yellow-browed Warbler, Greenish Warbler—the last-named a triumph for the Spurn Bird Observatory, occurring for the first time in Yorkshire, with North Cotes, Lincolnshire, just across the Humber, as the scene of one of the only known two previous occurrences in Britain; Barred Warbler, Desert Wheatear—a triumph for Halifax Co-operation occurring in Yorkshire for the second time, and

probably of the same western race as the previous occurrence ; Osprey and Honey Buzzard, Temminck's Stint and Little Ringed Plover. A few of these species are becoming annual visitors, probably because more intensive observation makes it a little less easy for birds that pass in very small numbers to escape detection. Such events are indeed highly interesting, but not much more so than is the emergence of a new fact concerning a familiar bird, unless we are rarity-conscious to an undesirable degree.

The work of sifting and collating the mass of information sent to me, of deciding what is of enough importance for publication in view of the space available, of adding to the interest where possible by the relation of fact to fact, of being concise without sacrifice of interest, has been a labour of love. It could not be done without the generous co-operation of my colleagues, and of a host of contributors whose names follow, to each of whom I tender my thanks :—

Ackworth School N.H.S., H. E. Adamson, G. H. Ainsworth, W. B. Alexander, Miss M. E. Ackerley, F. R. Allison, P. Andrews, M. J. Ardley, B. Astin, Mrs. F. M. Austerfield, A. Baldridge, P. Baldwin, E. F. D. Baker, Batley N.H.S., M. and Miss S. Barras-Smith, T. E. Barlow, F. Ball, R. S. P. Bates, W. Bennett, Beverley Grammar School Bird Club, G. Beven, P. G. R. Barbier, J. E. Beckerlegge, T. D. Bisiker, Miss P. Bond, Lord Bolton, R. Bramhill, Bradford N.S., K. Brown, Miss E. M. Brown, D. Brown, H. W. Bracken, H. O. Bunce, C. E. A. Burnham, E. B. Burstall, W. W. Butler, J. P. Busby, W. A. Butterfield, L. Carr, P. J. R. Clifton, C. A. Cheetham, V. S. Crapnell, Mrs. A. L. Chislett, G. W. Colbert, R. Crossley, Miss F. E. Crackles, John Cudworth, R. Crosbie, W. G. B. Davies, P. E. Davis, M. Darlow, G. B. Davidson, F. Dean, K. Dawson, I. D. Dougill, R. F. Dickens, Mrs. E. Dunning, A. C. M. Duncan, E. P. Evans, R. Eastwood, G. R. Edwards, J. C. S. Ellis, G. A. Ewbank, K. Fenton, W. F. Fearnley, W. Flesher, R. S. R. Fitter, J. A. Forder, I. J. Fergusson-Lees, G. Fryer, H. Foster, G. R. Frost, R. M. Garnett, J. B. W. Gardiner, G. A. Garton, A. Gordon, F. C. and J. S. Griffith, W. Greaves, R. F. Graham, Halifax S.S. and Halifax J.G., O. C. Hill, H. Heald, Harrogate N.S., A. C. Hoyle, E. Holmes, H. Hodgson, N. M. Hepworth, P. F. Holmes, A. Haigh-Lumby, P. A. D. Hollom, P. A. Humble, M. Hutchinson, G. E. Hyde, V. Huddlestone, J. H. Hyatt, K. Ilderton, D. B. Oles, F. Jefferson, M. Johnson, C. L. Jones, F. Kennington, A. C. Laughton, J. Lord, D. Leaver, Miss E. P. Leach, A. C. Laughton, K. Longstaff, H. Marjoram, R. W. Mackey, Miss M. Mackenzie, A. Macallister, Malet Lambert School O.S., N. V. Mendham, M. F. M. Meiklejohn, C. A. Milner, B. Mitchell, C. A. Mitchell, I. Morley, F. Murgatroyd, C. Nelson, B. and D. Nelson, F. Newton, E. M. Nicholson, J. C. Niven, H. J. R. Pease, A. Pilkington, C. F. Procter, A. W. O. Pacey, E. R. Parrinder, R. S. Pollard, R. M. C. Potter, G. R. Pryor, A. E. Pullan, P. C. Quinn, K. B. Rooke, R. Slater, H. Schofield, B. Speake, J. R. Scott, D. B. Smith, R. Smyth-Pigott, K. G. Spencer, Miss C. Shaddick, A. R. Summerfield, P. E. Stead, G. R. Storey, H. E. Stembridge, E. W. Taylor, A. F. Taylor, G. W. Temperley, A. Thompson, R. Tottie, D. C. Urquhart, J. P. Utley, D. Utley, A. J. Wallis, E. A. Wallis, K. Wheater, A. F. G. Walker, A. B. Walker, D. F. Walker, Miss J. Walker, J. Warham, R. Wagstaffe, Wakefield N.S., Wharfedale N.S., H. J. Williamson, F. Wilcox, Miss E. Wilbourne, D. I. T. Walker, K. Whitfield, C. Webb, Lady Worsley, H. F. Woods, A. H. White, Mrs. M. White, D. Wheatley, R. F. Wormald, G. W. Wrangham, P. Young, G. K. Yeates.

CLASSIFIED LIST

1. Raven.—A bird passing at Roman Camp, Cawthorn, on April 8th was being harried by Crows and had several right secondaries missing (R.M.G.). Two nests were robbed in the north-west ; after the annual contest between this species and a pair of Peregrines had been rather unusually lost by the latter (H.W.B.). Birds were seen above the high fells on several occasions. R. Bramhill recorded a bird at Spurn on August 5th and 6th believed from size and bill to be a Raven, but it was silent. Mr. Niven noted the heavy bill of a Raven in his garden at Swanland on December 26th and said the call was unmistakeable. (Ravens have been kept in a West Hull Park until recent years.)

2. Hooded Crow.—A bird passed west over Swillington Ing on November 6th was the most westerly occurrence reported in the year. Hooded Crows were also recorded at Gouthwaite on December 28th (A.F.G.W.), and near Masham on March 29th (P.Y.) ; but most records came from East and North-east Yorkshire.

A late straggler occurred at Spurn on June 5th (R.F.D.) none having been seen since May 6th. A bird near Patrington on September 25th was the first recorded in the autumn (J.C.S.E., R.C.). Flocks of up to 50 birds were seen going into Raincliffe Wood, Scarborough, to roost during February (A.J.W.). February 27th was the date of the largest number (19) seen at Spurn (R.F.D.), where 12 occurred on October 30th and 31st. Smaller numbers occurred on the eastern side at many places, including 11 near Hornsea Mere on December 31st (E.C.).

3. Carrion Crow.—Evidence of immigration of this species is not easy to assess—Carrion Crows were numerous on Bridlington sands on December 31st (G.H.A.).

4. Rook.—A pure white bird was seen at Gargrave on February 28th (C.N.).

14. Starling.—Recoveries of birds ringed as adult affecting Yorkshire were reported in *British Birds* for September, 1949, as follows :—

Ringed 3/1/46 at Thornton-le-Dale by R. M. Garnett, recovered Wadworth, -/12/48, 57 m. S.-S.-W.

Ringed 18/2/40 at Ackworth by A. Darlington, recovered Heligoland, 23/3/42.

Ringed 6/3/39 at York by Bootham School, recovered Forshem, Sweden, date uncertain.

Ringed 19/12/47 at York by Bootham School, recovered Ekeby (Östergötland), Sweden, 30/3/49.

Ringed 7/3/48 at York by Bootham School, recovered Fullerup (Fyn), Denmark, 13/7/48.

Ringed 3/3/48 at York by Bootham School, recovered Amsterdam, Holland, 15/8/48.

Ringed 10/2/48 at York by Bootham School, recovered Blankenberghe, West Flanders, 29/10/48.

Ringed 14/2/47 at Askham Bryan by R. Carrick, recovered Flensburg, Schleswig-Holstein, 11/8/48.

Ringed 6/3/47 at Leeds by R. Carrick, recovered Wallasey (Ches.), 26/1/49.

Ringed 15/3/47 at Leeds by R. Carrick, recovered Nigenga, Friesland, Holland, 29/7/48.

Ringed 21/2/47 at Leeds by R. Carrick, recovered Meppel, Holland, 30/6/48.

Ringed 16/10/48 at Huddersfield by N. Sykes, recovered Liverpool, 25/2/49.

Ringed 30/1/47 at Cleveleys (Lancs.) by R. M. Baud, recovered Ilkley, 11/8/48.

Ringed 23/1/48 at Cleveleys (Lancs.) by R. M. Baud, recovered Birstall, 6/5/48.

Ringed 2/2/47 at Cleveleys (Lancs.) by R. M. Baud, recovered Mexborough, 22/2/49.

Ringed 1/1/48 at Douglas, I.O.Man, recovered Wakefield 18/8/48.

Ringed 18/12/47 at Sale, Cheshire, recovered Thorne, 1/6/48.

Ringed 26/11/48 at Birkenhead (Ches.), recovered Bingley, 15/3/49.

Ringed 17/2/48 at Birkenhead (Ches.), recovered Crossgates, 6/6/48.

October 29th was the date in 1949 (and in 1948) when the largest numbers occurred at Spurn—1,000. Small flocks flew south towards the Point at Spurn on December 28th, and during the previous week (P.E.D.). The Ackworth School Report mentions two birds seen mating in October and one carrying straw into a chimney on November 3rd (N.V.M.).

18. Hawfinch.—Birds were seen in many places—Swanland, Scarborough, Skipwith, Helmsley, Harrogate, Eccup, Leeds, Fountains Abbey, Wharfedale, and Roche Abbey, where a pair bred (J.S.G., C.F.G., R.B.).

19. Greenfinch.—Seeds of salad burnet were reported as food on July 13th near Malham Tarn by P. F. Holmes. Many Greenfinches passed south at Spurn in October ; and many remained to feed with Chaffinches on seeded sea-rocket and other plants ; on the 24th Greenfinches so feeding numbered over 100 birds. Small parties were still present in late December, some of them bearing rings placed on them in early autumn.

20. Goldfinch.—This species has been reported from many areas in all three Ridings. A bird occurred at Spurn on April 30th ; and small numbers on several days in autumn (seven on October 31st, six on November 10th).

21. Siskin.—April 9th near Easingwold (F.J.) ; April 10th near Buttercrambe (J.L.) ; and April 14th at Saltaire (C.N.) were the latest spring dates. The first Siskins of autumn came on October 1st at Spurn (E.R.P., R.C.), and October 2nd at Thornton Dale (R.M.G.). A large flock frequented the vicinity of Cliffe Lodge, Hotham, from February to March 30th (E.B.B.). Small numbers

passed at Spurn in autumn ; and reports of winter flocks have come from many areas, of which the largest were two parties at Ripley Castle on February 27th estimated by A. F. G. Walker to total *c.* 65 birds.

23/27. Redpoll.—On September 22nd near Malham Tarn *c.* 50 Lesser Redpolls fed on seed-heads of meadowsweet ; and at Wintersett on December 10th three fed on seeds of greater willowherb. A large flock of *c.* 50 birds near Harrogate on February 7th included a bird noticeably larger and paler than the rest, with wing-bar and grey rump, which was considered to be a Mealy Redpoll ; a few of which race were noted with Lesser Redpolls at York by F. Jefferson, and near Helmsley on December 12th by A. Gordon. Eighteen ' Mealies ' passed at Spurn on October 31st, and a few Lesser Redpolls occurred there from October 20th to 23rd. Lesser Redpolls are still somewhat scarce as breeders but less so than in 1948.

28/29. Twite.—Birds were seen throughout the summer near Halifax ; and near Ilkley—one on April 23rd (H.H.) ; and on May 7th (D.I.T.W.), and near Keighley on June 28th (J.E.B.).

30. Linnet.—The mild dry weather may have had bearing on the presence of a flock of 80-100 birds at Greenhow on February 5th—50-60 of them sang together from one tree (R.S.).

33. Bullfinch.—At Malham Tarn, where the species is normally absent, small numbers appeared for a few days in September, as they did in October, 1948. F.J. records a flock of *c.* 30 near Haxby in December. Young were recorded near Scarborough in a nest built in bracken three feet above ground (A.J.W.).

36. Common Crossbill.—A bird at Spurn on September 4th gave good views and called (R.M.G., G.H.A.). A small flock fed on larch cones near Rievaulx on December 27th (A.G.). The species was reported near Loftus in August-September with 20 on August 2nd as the maximum ; and near Scaling in October (R.S.).

40/41. Chaffinch.—With a few birds present on the Spurn peninsula on most days ; the autumnal passage migration began to be noted on September 27th ; and birds were numerous throughout October, many staying to feed for days on seeds of sea-rocket and other plants. Two hundred birds at least were noted on October 8th and 9th. Around Halifax the sexes are rarely segregated in winter flocks (G.R.E.).

42. Brambling.—Unusually numerous about Rowley in the early months of the year (D.C.U.) ; when up to 300 birds remained in Ellerburn Wood, dwindling in March and April, and being last seen on April 16th (R.M.G.). A late bird occurred at Spurn on May 19th (A.L.C., R.C.).

Early arrival dates were October 2nd at Spurn, and October 10th near Thornton Dale ; after which Bramblings were again fairly numerous. Although more frequent in the eastern side of the county, some were reported from the neighbourhoods of Wakefield, Swinsty, High Royd, and in the Craven area.

43. Corn Bunting.—The occurrence of a flock of *c.* 50 Corn Buntings at Spurn on October 6th was unusual (E.R.P., I.J.F.-L., R.C.).

44. Yellow Bunting.—A bird was ringed at the High Royd Trap on April 11th, 1949, and recovered five miles west on July 20th, 1949 (G.R.E.).

59. Snow Bunting.—A few birds occurred inland in the early months—one at Hury Reservoir on January 9th (A.B.) ; one at Gorple on January 30th (G.R.E.) ; 27 near Mytholmroyd on February 1st (G.R.E.) ; and several near Danby Beacon (A.B.W.). At Spurn the bird was last seen on March 19th (M.F.M.M.) and at Teesmouth on March 20th (A.B.).

In autumn the earliest birds appeared on September 17th and 18th near Filey (A.J.W.) ; on September 18th, three at Spurn (R.B., A.C.H., B.N.) ; and on September 26th, two at Bridlington (H. F. Woods). By December 27th flocks at Teesmouth numbered 200 ; at which time there was a flock of nearly 100 about the Spurn peninsula (P.E.D.). Inland, four occurred on Gorple Moor on November 12th (J. Crossley), and one on Ilton Moor on the 14th (P.Y.) ; and small flocks on Bransdale Moor during December (A.G.).

62. Tree Sparrow.—In some cases birds were in their annual breeding haunts by the end of March. Twenty or more birds in stubble near Harrogate on October 30th were feeding on seeds of weeds of which knotgrass was the most plentiful (C.S.). Parties of up to 50 birds frequented the elders at Swillington Ing in late October (K.B.). Near Scorton on December 29th, A. Baldridge saw *c.* 150 Tree Sparrows. A flock of *c.* 25 at Spurn on October 8th (F.M.G., I.J.F.-L., A.M.)

was the only one to be noted ; but odd birds were seen on other dates in October and November.

69. Woodlark.—At least four pairs bred in the county in 1949 ; and more were suspected. At one East Riding site a bird was first heard on February 25th ; display was seen on March 13th ; and the adults were feeding a juvenile on May 14th (E.B.B., G.H.A.). A number of miles away a second pair, after being seen and heard on March 23rd, had four young in a nest on April 10th which were ready to fly on the 15th ; and an adult was heard in song again on June 5th (J.L.).

A third pair (first heard April 17th-18th) had five eggs in a nest on May 1st (J.L.). A fourth pair were feeding fledged and flying young on July 9th (R.C.). A bird was seen and heard in song at another place on May 10th (A.H. and M.W.). These places were many miles apart ; and there is every hope that the species is in process of becoming well established.

One of three birds seen near Cayton Bay, Scarborough, in a ploughed field on October 31st was heard to sing : the birds were still there on November 1st but had gone on the 2nd (H.J.R.P., A.J.W., E.A.W.).

70. Skylark.—On March 6th snow fell and K. Brown reported *c.* 75 Skylarks on stubble near Swillington, and *c.* 150 on refuse tips at Beeston, Leeds, and there were 50 at High Royd on the 5th.

On September 25th small parties were passing south at Swillington, and on October 1st at Beeston (K.B.). 100-150 birds in snow on Harrogate Stray on December 10th fed on the site of a threshed stack—in milder weather small parties are scattered about the Stray (A.F.G.W.). Concerning the absence of Skylarks from the Buckden area as reported in 1944 and 1945, J.E.B. records three singing near Hubberholme on June 23rd, 1949, and three in the Raikes area. Small parties were seen coming in from sea at Flamborough on November 6th (H.O.B.).

72. Shorelark.—The species continued to be present around Kilnsea up to April 8th ; with 27 visible on January 23rd (M.F.M.M.) ; and 28 on February 6th, when their food appeared to be seeds of *Atroplex portulacoides* and *Suaeda maritima* (E.C., H.O.B.). On March 19th the beginnings of courtship and aerial chasing were noted by M.F.M.M. J.P.U. noted two at Teesmouth on February 23rd.

At Spurn in the autumn two birds with black and yellow heads were noted by Mr. and Mrs. Greenfield on October 8th ; they were probably Shorelarks. Three were seen near Kilnsea Beacon on October 31st (P.E.D., J.C.), and on December 10th. Six were seen on the Humberside on December 3rd (John Appleton). *c.* 12 called as they flew overhead at Spurn on December 29th (G.H.A.). Two were seen at Teesmouth on December 27th (A.B.).

[74. Tawny-Pipit.—Two birds at Spurn on September 23rd differed in size, plumage and notes from any of the three British breeders and were thought by R. M. C. Potter to fit the description of the Tawny-Pipit.]

75. Tree-Pipit.—A bird I saw near Ripon S. Works on April 9th was early (R.C.). The next bird was reported from Bolton Abbey on April 10th (Wharfedale N.S.). A few days later birds were generally distributed.

76. Meadow-Pipit.—A bird ringed by A. J. Wallis at Gristhorpe Bay, Scarborough, on June 9th, 1949, was recovered at Alter Do Chãs, Portugal, on October 30th, 1949. A juvenile bird ringed at Spurn B.O. on August 31st, 1948, by F. E. Crackles and J. Walker, was found near Bordeaux on December 19th, 1948. A bird ringed at High Royd on November 16th, 1947, was re-trapped there on January 29th, 1949 (G.R.E.).

Exceptions to the Handbook Song Chart could be expected in such a fine year —a Meadow-Pipit sang six times in less than an hour at Ripley on September 25th (A.F.G.W.).

On March 22nd there were *c.* 250 birds of this species about Eccup Reservoir (S. and M.B.-S.) ; and large numbers beside Wintersett Reservoir on April 9th and 12th (Wakefield N.S.).

Return migration was noted at Spurn by K. Fenton on March 22nd. On April 2nd R. Slater watched small parties continually arriving oversea from east-south-east to Boulby Cliffs, to clear which they had to rise—some birds rested in the grass ; others continued flight inland. On October 24th H. J. R. Pease saw a flock of 20 on the Filey cliffs.

81. Rock-Pipit.—At Spurn, three birds were recorded on March 21st (M.F.M.M.), and small numbers in October. At Teesmouth odd birds were seen on every visit until March 20th ; and no more until five were noted on October

5th, after which the species again occurred frequently. Rock-Pipits were numerous on the rocks near Bridlington on December 29th (G.H.A.).

84. Blue-headed Wagtail.—Having been informed of the presence of a pair of this race near Grassington, R. Bramhill, J. S. Griffith and A. C. Hoyle investigated on June 6th, and noted the blue-grey head, white eye-stripe and chin of the male as young were fed. Aberrant *flavissima* is not an impossibility.

88. Yellow Wagtail.—April 10th near Burnsall (J.K.F.) ; and April 12th at Harrogate S.F. (K.I.), and at Wintersett (Wakefield N.S.) ; were the earliest recorded dates ; but birds continued to arrive for a fortnight or more afterwards. At Spurn the first passage migrant occurred on April 23rd (R.M.G.) ; and more birds were seen than has been usual, including 55 seen flying south on August 18th (G.H.A.). A bird was still about the Nidderdale breeding grounds on August 28th (R.C.). Birds were moving south at Teesmouth from August 13th to 18th (A.B.). On September 3rd Yellow Wagtails were numerous on the Swillington Slag ; and *c.* 20 passed south at sunset (K.B.) ; on the 21st numbers present were estimated at more than 500 (K.D.). Late dates were September 24th at Bingley (C.N.), and September 29th at Spurn (E.W., R.C.). A pair nested in the Vale of Pickering (R.M.G.) ; the species was scarce in Holderness (G.H.A.).

89. Grey Wagtail.—This beautiful species has almost recovered its pre-1947 status as a streamside breeder ; and as autumnal wanderer and casual winter visitor to districts that know it not in summer.

90. Pied Wagtail.—Work at the High Royd Trap is adding to our knowledge of migration of this species :—

A bird ringed as a juvenile on August 19th, 1948, was re-trapped on August 13th, 1949.

A bird ringed on August 10th, 1948, was at Ilhavo, Portugal, in early January, 1949.

A bird ringed on August 19th, 1948, was at Biarritz, France, on October 15th, 1948.

A bird ringed on July 9th, 1948, was at Luddenden (three miles, north-west) in February, 1949.

A bird ringed on August 5th, 1949, was at Liversedge on October 18th, 1949.

One ringed on August 22nd, 1948, was at Harwarden (Flints.) on September 20th, 1949.

Thirty birds reached Ilton Reservoir on April 15th (P.Y.) ; and there were many at Wintersett on April 9th and 12th (Wakefield N.S.) probably prior to spreading to the areas where they were reared. A roost in alders near Killinghall Bridge (Nidd) on September 27th included *c.* 50 birds. A male bird that reached Malham Moor on March 14th was joined by a hen on March 21st and bred. Most of the birds had left by October 8th, but odd birds were seen until November 18th (P.F.H.).

91. White Wagtail.—Individuals of the spring passage across the county were noted as follows—April 14th and 17th, at Harrogate S.F. (K.I., A.F.G.W.) ; April 21st, one on my potato patch at Masham (R.C.) ; April 23rd, two at South Gare ; April 29th, one at Elland (H.J.G.) ; May 6th, three birds at Fairburn (M.F.M.M.) ; May 7th, two birds at Swillington Ing (K.B.) ; May 13th and 19th, single birds at Spurn (R.C., A.L.C.). The species is much less determinate in autumn. Of 12 grey-backed birds at Teesmouth on September 6th, and 11 on the 17th, several had also grey crowns (A.B.).

96. Nuthatch.—Bred at Thornton Dale (R.M.G.), and near Egton Bridge (C.E.A.B.). Five or six broods were reared in Duncombe Park. Two were calling in the woods at Plumpton Rocks on April 20th (A.T.). Birds were as usual in South Yorkshire ; and about the lower ends of the Dales.

97/98. Great-Tit.—P.E.D. reported a movement of small parties southward at Spurn in late December.

99/100. Blue-Tit.—This species occurred in flocks on heather in Baldersdale on December 6th (J. R. Scott). At Spurn small numbers were recorded from September onward with *c.* 20 on October 2nd as the maximum. Two that were handled on September 26th were suspected, from coloration and breadth of white tips to greater coverts, to be continentals (R.C.). Of a party ringed at the Point trap on July 17th, one was recaptured there on August 21st and another on December 31st—they might have bred locally !

107. Marsh-Tit.—A nest below ground level in base of a tree at Buttercrambe on May 8th was unusual for this species (J.L.), but not for the Coal-Tit.

108. British Willow-Tit.—A bird near Loftus-in-Cleveland that was carrying food on June 1st had a dull crown and called the harsh ' tchay ' (R.S.). Birds have been noted elsewhere in areas where the species is already known to occur.

111. Long-tailed Tit.—A bird ringed on April 17th was an unusual visitor to the Spurn peninsula.

114. Great Grey Shrike.—Not recorded at Spurn in 1949. A dead bird was sent to G. K. Yeates from Lofthouse at the end of March. A bird was seen at Farnley on April 6th (J.A.F., H.J.W., W.F.F.). A bird near Woodlesford on October 30th was inspected whilst perched and on the wing (K.B.). And one occurred near Hackness on December 9th (M. Johnson).

119. Red-backed Shrike.—A pair seen near Ulley on May 3rd did not appear to stay (R.B., A.C.H.). Single birds were recorded at Spurn on August 14th (G.H.A.) ; and on September 4th, 7th and 8th (R.M.G., C.E.A.B., R.F.D.) and September 25th (H.J.R.P.).

120. Waxwing.—Birds were seen in the early part of the year—*c.* 30 in the Rivelin valley, Sheffield, on January 23rd (A.F.T.) ; at Middlesbrough where they remained until March 10th, with *c.* 70 as the maximum (O.C.H.) ; and 24 at Scarborough on March 10th (A.J.W.) and a few birds at other places. Courtship behaviour was noted at Middlesbrough on January 13th.

In the autumn, three birds seen by H. O. Bunce in Hull on November 9th, and a few near Whitby on the 10th, were the first to be seen. The Whitby birds had increased to 28 on November 18th (C.E.A.B.). Two birds near Holmforth on November 27th (G.H.A.) had got well west. At Middlesbrough arrivals began on November 16th and increased to 30-40 birds ; and *c.* 100 were seen at Saltburn (O.C.H.). Smaller numbers occurred about Loftus-in-Cleveland, Scarborough, Thornton Dale, Pickering, Kirkby Moorside (40 on December 10th, E.W.T.), Hovingham, Fulford, Bridlington, Hull, Collingham, Harrogate, Darlington, Austwick, Burley-in-Wharfedale, Hebden Bridge and Masham where a few occurred from December 20th to the year end. Food recorded included rose-hips, haws, pears, apples, asparagus and contoneaster berries and rowan berries.

121. Spotted Flycatcher.—May 11th in Riffa Wood, Wharfedale, was the earliest reported date. Several observers found Spotted Flycatchers to be absent from their usual haunts. Sparrows ejected the eggs from one nest on a house near Nunthorpe (G.A.E.). None was seen in spring at Spurn, where the first autumnal record occurred on August 20th (E.C., G.H.A.) ; and the last on September 23rd (B.N., R.C.). At Teesmouth two birds occurred on August 28th, and one on September 24th (A.B.).

123. Pied Flycatcher.—The species was first noted in Bolton Woods on April 15th (A.T.). Numbers were well up to the average in the many known regular breeding places, and in some areas increases and extensions were noted. A pair used a nesting box in a wood inside the Sheffield City boundary (G. R. Storey, M. Darlow). Nesting boxes had been erected in woods near Bolton Hall, and out of 15 examined 12 were occupied by this species (Lord Bolton). A female that had been ringed there in 1947 ; and two ringed in 1948, occupied boxes in the N.E. Yorkshire forests (R.M.G.).

At Spurn a Pied Flycatcher occurred on April 23rd ; but the spring passage was very sparse. In autumn, after odd birds on July 30th and August 10th ; the real movement began on August 21st (*c.* 20 birds), and continued until September 6th, with a few blank days before a second minor passage followed from the 22nd until the 26th, with an odd belated bird on October 8th.

125. Red-breasted Flycatcher.— A bird caught at Spurn on September 13th, and seen again on the 14th, was inspected and described in detail by R. Slater, R. Crossley and H. Schofield. With a throat and upper breast of ' very pale orange ' the sex must have been male.

126/7. Goldcrest.—This bird has recovered from the effects of the early 1947 severity to a considerable extent ; and the possibility that this has been partially due to the large waves of immigrants of late 1948, some of which may have remained, must not be ruled out.

In February, Rev. K. Ilderton said the species ' literally swarmed ' near Harrogate ; and most coniferous woods had birds in the early months of the year ;

with some, but far fewer, in the breeding season. There was a Goldcrest at Spurn on April 18th (M.B.-S., A.H.W.).

The first autumnal record at Spurn was noted on September 13th and a few birds continued to be seen daily until October 1st. On October 6th more arrived and by the 9th numbers were estimated at well over 100 ; by the 16th they seemed to have gone. On October 5th, R. F. D. saw at least nine at Bronte House where they are unusual.

From October 22nd further birds were seen with a maximum estimate of *c.* 40 on October 31st and November 1st, and few birds were still present in the last week of the year (P.E.D.).

The following records are presented for comparison with events at Spurn—September 24th, 40-50 at Teesmouth in thick fog (A.B.). One by Blackstone Edge Reservoir at an altitude of over 1,000 feet on September 27th (G.R.E., M.B.-S.). October 8th, *c.* 15 near Loftus-in-Cleveland (R.S.). *c.* 20 near Aiden Hall in the Hambleton Hills on December 28th (J.P.U.). Three in a garden at Bridlington on December 13th (H.F.W.) On October 9th, *c.* 100 on cliff top near Filey Brigg (A. J. Wallis) ; and on the 12th, *c.* 20 birds almost a mile inland thence (H.J.R.P.). Immigration in the 1949 autumn was in smaller numbers than in 1948.

129/131. CHIFFCHAFF.—A small Warbler near Whitby, first reported on February 17th, and declared, by March 19th to be ' almost certainly ' a Chiffchaff, may have been of the Scandinavian race (A.B.W.). March 24th at Harewood (K.W.) was the earliest normal date for the species. Two Chiffchaffs trapped and ringed at High Royd on September 23rd ; and two birds identified at Mytholmroyd on the same day must have moved three miles east if they were the same birds (G.R.E., A.M.). Travelling birds were also noted : at Teesmouth, one on September 24th (A.B.) ; and one in Malham Tarn Woods on September 26th (P.F.H.).

At Spurn, May 6th was the date of the only spring record. After odd birds had been seen on August 1st no more were identified until September 30th after which a few birds occurred up to October 13th. A Leaf Warbler was seen about the Spurn Chalk Bank on December 29th—the late date, the blackish legs, the uniform grey-brown of the upper parts, and the grey-white of the underparts, and lack of yellow, indicated this species—probably of the Scandinavian race (P.E.D., W.A.B., G.H.A.).

132/3. WILLOW WARBLER.—E. B. Burstall noted a bird at Cliffe on April 4th ; two birds had reached Farnley lakeside on April 6th (W.F.F., H.J.W.) ; near Harrogate (K.I.) and Chevet Wood, Wakefield, on the 7th ; and several places on the 9th ; by the 12th the species was generally distributed.

A bird ringed at the High Royd Trap on 26/7/48 was re-trapped on 14/8/49. A bird caught at the Warren Trap, Spurn, on 1/10/49, had already been ringed as a nestling at South Sundsvall, Sweden, on 26/6/49. This was the first of the species ringed abroad to be caught at a British Bird Observatory. The species first appeared at Spurn on April 5th ; and peak days of the spring passage migration were April 21st, May 5th and May 17th, when more than 20 were counted on each day. The northern sub-species was suspected on several days in May. The autumnal passage began at Spurn on July 30th, and the species was last noted there on October 11th, with 14 as the maximum counted in a day on August 27th.

A single Willow Warbler seen at Clifton, York, on November 26th, was unusually pale and was considered to be of the northern race (E.W.T.). A nest found at Malton in July was placed 15 feet up in the virginia creeper on a house wall (R.M.G.).

134. GREENISH WARBLER.—A Greenish Warbler was seen, caught, and ringed at Spurn on August 21st by G. H. Ainsworth. Careful notes were taken, and verified by H. O. Bunce, D. F. Walker, C. Milner, W. D. Hincks and Dr. Butler, of Manchester University, who drew an outline of the flattened wing—the 2nd primary equalled the 7th in length. The bird was first seen taking flies on the cottage sycamores. Features noted include a single whitish-yellow wing-bar, emargination of the 3rd to 6th primaries ; brown tarsi, and a frequent double note (ssee-ssee) quite unlike any note of the Willow Warbler, of which latter species none was seen that day. Detailed notes were also made by C. Milner before checking by reference to the Handbook. It was the first record for Yorkshire ; and apparently the second for England, one having occurred at North Cotes,

Lincolnshire, on the south side of the Humber on September 5th, 1896. A third occurred in Shetland on 12/9/1945.

135. Wood-Warbler.—Bradford Naturalists record a bird in Shipley Glen on April 14th ; and birds were seen on the 17th near Masham (R.C.), and in the Vale of Mowbray (J.P.U.). At Spurn odd birds were recorded only on May 17th (A.L.C., R.C.) and on August 29th (E.C., E.H.).

137. Yellow-browed Warbler.—A bird caught in the Spurn (Warren) Trap on October 6th by A. L. Chislett and E. Holmes and correctly named by them, was placed in a box for inspection by those who were working the Point trap at the time. The greater wing-coverts had broad creamy-yellow tips, those to the median coverts were narrower and less conspicuous ; but together produced the double wing-bar. An inconspicuous but distinct pale yellowish line centred the brownish-green crown. The eyestripe was broad, yellowish ; the back and tail coverts pale brownish-green, tail feathers blackish-brown, underparts white tinged yellowish, tarsi brown, bill brownish with an almost salmon tinge at the base of the lower mandible. After being released the bird's points were studied as it flitted about some bushes ; and Messrs. E. R. Parrinder, F. M. Gurteen, I. J. Fergusson-Lees and G. Beven had no difficulty in identification of a second Yellow-browed Warbler which showed its yellowish wing-bars later in the same day in bushes north of Kilnsea (R.C.).

145. Grasshopper Warbler.—There was one breeding record in the Nunthorpe district where a nest held five eggs on May 26th. The young hatched 12 days afterwards but a week later had disappeared. The old birds remained about through the summer (G.A.E.).

Reports of birds heard reeling came from Nunthorpe on May 1st ; Roche Abbey, two on May 7th (R.B., F.C.G.) ; from four places about Loftus on dates from May 7th into July (R.S.) ; Scarborough cliffs on June 5th (A.J.W.) ; near Whitby on June 27th (A.B.W.) ; Swillington Ing on May 17th (K.B.) ; Methley, May 3rd (P.B.) ; Stapleton Park, July 23rd (N.V.M.) and a few other places.

149. Reed-Warbler.—A pair were feeding young near Weeton in a small newly-formed reed-bed on June 22nd (A.H.-L.). Birds were seen in summer about Swillington Ing, but breeding was not proved (B.S., P.E.D.).

153. Sedge-Warbler.—April 21st at Methley (P.B.) was the first inland record. At Spurn, a bird was first noted on April 17th. The local breeders were more numerous than usual, and confuse the migration tally. The species was last noted on September 10th. A Sedge-Warbler ringed on July 13th, 1947, was recaptured on July 17th, 1949.

149. Barred Warbler.—Miss E. Crackles took full plumage details of a Barred-Warbler trapped at Spurn on August 23rd. Barring was faint but distinct on the flanks ; and very distinct on the under-tail coverts. A large shrike-like warbler, in general colour grey, with long fanned tail and with beak stout for a warbler ; whilst being handled the bird indulged in much chattering and harsh scolding.

161. Garden Warbler.—April 23rd in the Vale of Mowbray (J.P.U.) was an early date for the species. At Spurn two birds occurred on May 13th ; and single birds on the 14th, 18th, 21st and 25th. In autumn a few birds were recorded on 11 days from August 17th to September 18th inclusive.

162. Blackcap.—For details of a bird near Ripley Castle on January 29th/30th see A.F.G.W. in *The Naturalist* for April-June. The first bird of spring was also recorded at Ripley on April 16th (A.F.G.W.), and at Spurn on the same date. October 9th was the date of the only bird to occur at Spurn in autumn.

163. Common Whitethroat.—Bradford Naturalists reported a bird in Wharfedale near Burnsall on April 10th ; the next was at Acomb on April 16th (A.H. and M. White). April 23rd was the date of the first recorded at Spurn and the maximum number (*c.*25) occurred on May 13th. A late autumnal bird occurred on October 2nd.

A bird ringed as a juvenile at Spurn on August 17th, 1948, was caught and released at Robin Hood's Bay on June 16th, 1949.

A bird ringed at the Point trap on 28/8/49 and recaptured there on 6/9/49, had reached the Warren trap, three miles north, on 10/9/49.

164. Lesser Whitethroat.—A pair nested in a syringa bush in my garden at Masham. A few days after the young had flown, the cock renewed singing from July 6th to 8th (R.C.). R.M.G. and G.H.A. report the species as very scarce in

their areas. At Spurn single birds occurred on May 11th and 18th ; and on five days from August 16th to September 12th.

165. Siberian Lesser Whitethroat.—A bird ringed at Spurn on October 9th was identified by reference to the second primary which was between the 6th and 7th in length (R.C., J.L., C.A.M.).

173. Fieldfare.—Winter flocks presented no unusual features in either the early months or the late months. P. Young noticed that flocks about Ilton grew larger in late March and early April. In Wharfedale, *c.* 300 on January 9th (H.M.) and *c.* 350 on January 24th (R.S.P.B.) were noted. Near Eccup there were *c.* 200 on February 27th and a similar number south of Harrogate on April 15th (A.F.G.W.) ; and several hundreds near Greenhow Hill on March 19th (C.S.). At Spurn the last bird was seen on May 4th (R.C., E.H., C.A.M.).

Twenty-four birds at Riffa on September 3rd were early (H.M.). Two birds at Spurn on September 21st were the first there in autumn ; and no more occurred until October 23rd, after which passage in fair numbers was regular for a fortnight.

174. Mistle Thrush.—This is another species which is now recovering its pre-1947 numbers in most areas. On October 1st, *c.* 20 occurred near Ripley Castle ; and on the 8th there were *c.* 25+, after which only a few single birds and pairs could be found (A.F.G.W.). There were *c.* 10 on Swillington Slag on October 23rd (K.B.). Three birds that flew calling over West Cliff, Whitby, from north on November 3rd seemed to have come in from sea (A.B.W.).

175/177. Song-Thrush.—A bird ringed as young at Apperley Bridge on 14/5/48 turned up at Huddersfield on 27/2/49 (E.P.L. in *British Birds*).

178/9. Redwing.—Last noted in spring on April 7th at Spurn (E.C.) where the first autumnal record occurred on September 25th ; one day later than the first record at Teesmouth (A.B.). From then onwards numbers on the coast increased with *c.* 300 at Spurn on October 6th, when E.R.P., F.M.G., I.J.F.-L. and R.C. were out before dawn listening to the calls of many Redwings and some Blackbirds overhead in the darkness. Later some were seen to fly across to Lincolnshire from near to the Point, where *c.* 200 Redwings remained scattered about the bushes. This was the biggest rush of the autumn of this species at Spurn. On October 8th, various parties about Harrogate were estimated at *c.* 150 (A.F.G.W.). *c.* 100 flew over Ilton on October 26th, coming from north-east—where Teesmouth lies (P.Y.).

On November 9th a Redwing at Spurn was noticeably darker on the back than others with which it could be compared ; and was very tame refusing to fly more than a yard or so. Several other dark birds were seen on the 10th and G. R. Edwards considered they might be of the Icelandic race.

Yew berries were used as food in early October about Thornton Dale where the first autumnal birds were seen on October 3rd (R.M.G.).

182/3. Ring-Ousel.—At Gorple the keeper reported a bird on March 14th ; and Gorple was the habitat of the next bird seen in spring on March 27th (M.B.-S., G.R.E.).

A bird ringed as young at Gorple by E. W. Watson on May 11th, 1946, was recovered at Iciar (Guipuzcoa), Spain, on March 21st, 1948 (E.P.L. in *British Birds*).

Passage migrants at Spurn were noted on April 17th, 21st and 22nd. In autumn a bird occurred on October 7th and two on the 9th, and 24th ; and one at Bridlington on October 18th (H.F.W.). The suspicion that one of the birds seen on October 9th might be of the Alpine race was aroused by its very light appearance and light edges to feathers on abdomen (R.C., J.L.).

184. Blackbird.—A male and a female ringed at Horsforth on 8/1/48 and 18/3/48 respectively were there in December, 1949, after being mates in both years (P.E.D.). A bird ringed as young at Winestead on 17/5/48 by H. O. Bunce was at Hull (15 miles west) on March 28th, 1949 (E.P.L. in *British Birds*).

A hen Blackbird washed fibrous roots of privet in a bird bath on April 24th at Harrogate and took seven minutes over one beakful. Was the object to remove soil or to soften it for use as reinforced mud? (W. B. Burrell per A.F.G.W.). At Ramsgill, Nidderdale, Mr. S. Denison watched a Kingfisher feed on minnows in a shallow beck. A hen Blackbird watched too, and alighted on a stone to catch a minnow which she pecked at until all was eaten, without having administered the Kingfisher's *coup de grace* (*Field*, 8/8/49). A pure white bird occurred in Harrogate

in December (K.I.). A nest at Ackworth, with a Blackbird sitting, contained three eggs, and four of Song-thrush (N.V.M.).

Blackbirds could be seen at Spurn throughout the year, albeit they were never many, and often could only be found with difficulty, until a minor immigration came on October 6th ; and a major one from October 24th to November 2nd ; a few birds remained thereafter. On October 29th, numbers present were not less than 200 birds. On November 12th, A. Baldridge reported *c.* 30 in the dunes at Teesmouth. P. F. Holmes noticed an influx about Malham Tarn—14 were together in one field on November 3rd. Numbers began to frequent the gardens and parks of Hull from November 10th.

A hen Blackbird ringed at Spurn on March 17th was found dead on July 6th at Norden, East Friesland, Germany (per R. Drost). G.H.A. says : ' some birds appear to enjoy being ringed—" T.E. 403 " was ringed in April, 1947, and has been recaptured more than a dozen times in 1948 and 1949 ; often with others that have come with him to the trap.'

186/7. WHEATEAR.—The earliest record came on March 24th from Malham Moor where the main influx arrived from April 11th-13th (P.F.H.). Both races were seen at Teesmouth on April 23rd (O.C.H.). At Spurn, where the first Wheatear occurred on March 26th, the maximum passage was reached in spring on May 5th, and in autumn on August 24th. A bird occurred as late as October 22nd (G.R.E.). Inland records are numerous and normal.

188/190. DESERT WHEATEAR.—A Wheatear was reported on the hills near Halifax on November 12th, 1949, by a reservoir keeper, but contact was not made until December 18th when C. A. Mitchell and P. Andrews saw the bird fly away from them and noted the tail pattern was unusual. On the same day R. Crossley noted the black throat and cheeks, and later, all three members of the Halifax Junior Group saw the bird at close range and made notes and sketches ; and it became obvious the bird belonged to one of the races of Desert Wheatear. After some attempts and experiments with baits the bird was caught on January 9th, 1950, by G. R. Edwards, P. E. Davis and R. F. Dickens, and released after being photographed, measured, sketched, described and ringed. When its racial form has been decided it is believed the bird will prove to be a Western Desert Wheatear (*Œanthe deserti homochroa* (Tristram)), or a typical Desert Wheatear. It was last seen on January 26th, 1950.

An adult male, the bird spent much time hawking for insects in mid-air and on walls and the ground. Worms were used as bait to induce entry into the trap. In addition to those named already the bird has been seen by R. S. R. Fitter, P. A. D. Hollom, I. Morley, H. Foster, S. and M. Barras-Smith, V. S. Crapnell and F. Murgatroyd.

G. R. Edwards (Operation *Desert Wheatear*, Commandant) tells me that the bird had taken up its winter quarters near to a farm known as EGYPT !

197. WHINCHAT.— A bird had reached Meltham (Huddersfield) by April 11th (J.C.S.E.). Birds were noted at Spurn from April 17th to May 17th ; and from August 2nd to October 8th ; with *c.* 30 on September 10th (R.S., R.F.D.) as the maximum. There were three at Teesmouth on August 28th (A.B.). Two were above Malham Cove on September 11th (P.F.H.).

198. STONECHAT.—Reports of the Stonechat need to be treated with caution ; so many country people use the name for the bird more correctly known as Wheatear. Many of us kept a keen eye and ear open for this species in 1949 without much success. Efforts to find Stonechats in the north-east, where the species bred a few years ago, were unsuccessful. Birds occurred—one at Marsh Ghyll, Wharfedale, on April 1st ; a pair at Linton on April 27th (W. D. Holmes) ; two pairs above Gordale on August 14th, and two birds near Malham Tarn on October 27th, and one on the 28th (P.F.H.), two below Cronkley Scar on October 28th (C.E.A.B.), and a cock at the edge of Ilton Moor on December 15th (P.Y.). Two birds occurred about Kilnsea from October 6th to 9th and 21st to 24th ; and from the 30th to November 1st (G H.A.), and on November 27th (H.O.B.). A young male was ringed.

201. REDSTART.—April 5th at Ilton (P.Y.) and April 7th at Elland Wood, an exceptionally early female ; were the earliest dates for the species ; of which most did not arrive until April 20th or later. Several people report the species as unusually numerous in the breeding season, except in the East Riding. At Spurn, passage birds (two) occurred on April 17th ; and odd birds daily until the 20th, with a few more on seven days in May up to the 18th. Southward passage

began on August 4th ; and continued at intervals until October 9th ; with *c.* 20 on September 25th as the maximum. E. B. Burstall saw birds at Cliffe in August and September ; and one occurred at Filey on September 24th (H.J.R.P.).

202. Black Redstart.—At Spurn odd birds were seen daily from April 5th to 7th, two on the 8th and one on the 17th. The next bird occurred on July 24th, with no more until October 7th ; after which up to three birds were seen on a number of days with the last on November 1st.

A male occurred at Scarborough on March 5th (A.J.W.). A cock bird sang from blitzed buildings in Hull on June 21st to July 9th (E.B.B.). On the 10th two birds flew from a high crevice towards the High Street but were not located again (G.H.A.). On September 25th two cocks sang in the same area, one of them 13 times in a minute (E. M. Nicholson).

203. Nightingale.—Birds sang near Roche Abbey from May 8th to 22nd (R.B., F.C.G., J.S.G.) ; at Sand Hutton from April 23rd for several weeks (J.L., E.M.R., E.W.T.) ; near Byland's Abbey on June 4th (R.M.G.) ; one near South Cave was heard to sing on May 23rd (J. W. F. Hall) ; May 29th (D.C.U.) ; and June 21st (E.B.B.). The species was present in its more usual Yorkshire haunts (G.E.H.). A bird was caught and ringed at Spurn on September 11th (R.F.D.).

207/8. Robin.—No large influx was noted at Spurn in autumn this year.

210/11. Hedge Sparrow.—More were noted at Spurn (*c.* 20) on October 6th and 7th than at any other time. H. Pease recorded an influx at Filey on October 10th and thought that two birds on branches over 14 feet high on October 13th were probable migrants.

213. Wren.—Back to normal numbers about York (J.L.), and generally in the West and North Ridings (R.C.) ; but not yet in the East Riding (G.H.A.). A Wren was seen trying to swallow a worm at Spurn on December 23rd (P.E.D.).

218. Dipper.—This species again reared two broods in the same nest near Loftus, hatchings being in early May and by June 22nd (R.S.).

221. Swallow.—The first spring birds occurred at Ben Rhydding, S. Beds., on April 3rd (K.F.) ; at Swillington, four on April 4th (M.F.M.M.) ; on April 5th at Bramhope (S. & M.B.-S.), at Hawnby (P.B.), and at Spurn (one) (E.C.). Birds at Otley, Bolton Abbey and Ripley on the 7th were also early. Birds were crossing the Tees estuary to the Durham side at Teesmouth during most of April 23rd (A.B.). In late April and May many migrant Swallows passed south down the Spurn peninsula on a number of days, and continued so to do into June. Mid-August was a time of great activity at Spurn ; and *c.* 1,500 or more Swallows were estimated to pass south on each of the days 13th, 14th and 15th.

Some people thought the dry summer and consequent shortness of mud might be a reason for a paucity of breeding birds in some areas. Late records include five birds at Crofton on November 5th (I. D. Dougill) ; four at Spurn on October 31st and one on November 1st and 11th (A.M., G.R.E.) ; and a bird at Staveley, near Harrogate, on November 13th (C. Webb).

222. House Martin.—Birds at North Cave on April 5th (J. W. F. Hall), and at Bolton Abbey on April 7th, appear to have been the earliest. Birds arrived under the eaves of A. Haigh-Lumby on April 16th ; but the last pair did not come until mid-May. Late dates were November 3rd, two at Hessle (R.M.C.P.), and November 5th (three) at Loftus (R.S.) ; two over Ripley Lake on November 5th (A.F.G.W.) ; November 10th at Hull (J.A.) ; a bird at Scarborough on the 13th (E.A.W.) ; and birds at Filey—ten on November 11th and four on November 20th (H.J.A.P.).

223. Sand Martin.—April 2nd, Ben Rhydding (Wharfedale N.S.) ; April 3rd, Harewood (K.W.) ; and April 3rd, Swillington (I.M.) and on the 4th (M.F.M.M.), are the earliest dates recorded.

A Sand Martin ringed on May 18th, 1948, near Spurn was found dead on a nest near Withernsea on August 24th, 1949.

Maximum spring movement at Swillington Ing was noted from April 20th to 22nd—on the 21st over 1,000 birds were hawking over the water into a fresh west-north-west breeze. On August 4th, more than 1,000 birds were congregated at Swillington Ing about sunset (K.B.). At Spurn, *c.* 600 recorded for August 14th (G.H.A.) indicated the maximum movement. A straggler at Spurn on October 17th (G.R.E.) was the only very late bird.

225. Swift.—Although most birds did not arrive until well into May a few April Swifts were reported—April 17th, near Ilkley (R. F. Graham) ; 23rd,

Harrogate, and 24th, Staveley (D. M. Jesper) ; two at Wintersett on April 25th (Wakefield N.S.) ; two near Skipton on April 26th (A.T.) ; five at Apperley Bridge on April 27th (R.F.D.) ; four near Harrogate S. Farm on April 28th (K.I.) ; and near Easingwold on April 29th (A.B.W.). Quite a long list for April—most birds came from May 8th—15th.

An adult Swift entered my bedroom after dark on June 25th and circled the central light ; dropping to the carpet when the light was switched off. With the light on again the bird easily rose from the carpet and resumed circulation round the light. It was caught and ringed ; and flew away into the darkness (R.C.).

At Spurn after a single bird on April 21st (A.H.W., R.S.P.) no other was seen until May 22nd. There was a passage movement southward from May 30th to June 11th (R.B., H.H., H.O.B.) ; and also on July 31st. The last bird to be seen occurred on October 14th (R.S., R.Cr.).

227. Nightjar.—Breeding was reported from near Masham—two nests seen (P.Y., R.C.) ; Wakefield (Wakefield N.S.) ; Bingley (C.N.) ; Rivelin, near Sheffield (A.F.T.) ; and in the north-east (R.S.). Birds were heard calling at other places ; and the species is distributed widely if not very numerously.

232. Hoopoe.—A bird was shot amongst Starlings on April 23rd near Hull (C.F.P.). Members of the Hull Scientific Society had good views of a bird at Kelsey Hill on September 10th.

234. Kingfisher.—A bird at Spurn on October 10th (R.C., J.L., etc.) was a reminder that little is known of the movements of the species. E. W. Taylor describes it as more numerous on the Rye than for many years ; and numbers are restored on the Wharfe and elsewhere. Near Boston Spa, a nesting hole in a cliff over 20 feet high held young on July 22nd (B.S.). Near Leathley two broods were reared in the same hole (P.E.D.).

235. Green Woodpecker.—The species is recovering its pre-1947 status in most wooded parts of Yorkshire.

236/237. Great Spotted Woodpecker.—This species, probably of the Northern race, was seen at Spurn on a number of days from September 14th to October 31st, three on September 25th being the most in one day. A bird at Teesmouth on September 24th (A.B.) ; one at Whitby which was seen to come in low from sea on September 20th, and to rise to clear the pier and east cliff (A.B.) ; and single birds at Filey on September 26th and November 19th (H.J.R.P.) ; may all have been connected with the same movement, some of the effects of which were I believe recorded on the coast very much further north in Britain.

238. Lesser Spotted Woodpecker.—A bird was watched drumming at Thornton Dale on February 6th (R.M.G.) ; and a cock was excavating at Bretton on May 7th (J.C.S.E.). Two family parties were seen in Duncombe Park in late June (A.G.). Birds were also seen at Cliffe, Masham, Chevet Woods, near Sheffield, Wigginton, Buttercrambe, Harewood, near Harrogate, near Lindley Bridge ; and one was picked up dead near Pateley Bridge in November, 1948. A male in Elland Park Wood on January 27th and in February was the first recorded since 1904, and the first ever seen alive in the Halifax district (G.R.E. and H.J.G.).

239. Wryneck.—Single birds were seen at Spurn on each day from August 27th to August 30th, two being ringed (E.H., M.B.-S., E.C.). One trapped bird, with outstretched neck, repeatedly drew its bill along the floor. A bird seen by P. G. R. Barbier on September 1st in a tree below Otley Chevin repeated clearly the Wryneck call, and may have been connected with the migration of the species from somewhere abroad suggested by the date.

240. Cuckoo.—The earliest spring record came from Ackworth on April 14th (N.V.M.) ; and the next from Spurn on the 15th (S. & M.B.-S., etc.), where the latest juvenile occurred on August 30th (E.H., E.C.). On August 13th, G.H.A. noted both adult and juvenile near Spurn Point at the same time. Near Rotherham a Chaffinch fed a nestling Cuckoo with crumbs on June 11th ; and a pair of Greenfinches fed another on June 24th (R.B.).

249. Little Owl.—Nested in Cragg Vale near Mytholmroyd (F.D.). Extension of known breeding grounds is indicated by the following :—a nest with two eggs near Stokesley on May 16th in which young were reared (J. Hyatt) ; probable breeding on the edge of Malham Moor (P.F.H.) ; two adults with fledged young near Sleights, Whitby, on June 20th (C.E.A.B.) ; four young reared beneath a pile of stones at Ravenscar (A.J.W.). H. J. R. Pease reports the species to be not

scarce near Filey. A young bird ringed at Byladd on 26/5/1940 was at Upsall (six miles west) on 26/10/41 ; and on 24/7/48 (E.P.L. in *British Birds*).

250. Long-eared Owl.—Records have been sent as follows—a bird on Ilton Moor hunted in daylight on March 20th (P.Y.) ; a pair near Loftus on April 30th which had their eggs taken (R.S.) ; in Washburndale on May 8th a bird incubated in a pine tree and three large young were visible on June 9th (D.L.) ; in Baldersdale on April 20th (J.R.S.) ; young in a nest in Rosedale on June 6th (H.O.B.) ; young seen on June 21st in the Whitby area (C.E.A.B., A.B.W.) ; six together in May near Winestead (T. Nettleton) ; and several, probably a family party, in a wood near Cliffe in early July (E.B.B.). One bird occurred at Spurn on April 29th (R.F.D., C.A.M., etc.).

251. Short-eared Owl.—From the large numbers of records received it is clear that this species occurs much more frequently than some years ago. Breeding occurred near Hebden Bridge (F.D. and V.S.C.) ; in the Danby area of Cleveland (J.L.) ; near Tan Hill, two pairs (J.P.U.) ; near Sedbergh and in Upper Wensleydale (H.W.B.) ; in Baldersdale a nest held an addled egg and five young of several sizes on May 12th (J.R.S.) ; Darnbrook Fell, young seen on June 8th (P.F.H.). Up to March, 1949, there were 'quite a few' about the hills above Littondale and on Malham Tarn Moor—voles, previously abundant, slumped in the spring and Short-eared Owls became difficult to find (P.F.H.). Records of birds seen are too numerous to list.

A bird ringed at Barr (Ayrshire) on 6/5/48 as young was recovered at Pateley Bridge on 10/8/48.

Fewer than usual occurred at Spurn—single birds on April 23rd, August 15th and 16th, September 22nd, and October 26th, 27th and 31st. Odd birds were seen along the dykes of Holderness in autumn. One crossed Filey Bay on July 31st mobbed by gulls (A.J.W.).

253. Tawny Owl.—A bird on July 26th sun-and-dust-bathed in hot sun at 2-30 p.m. near Ackworth (N.V.M.). A nest at Dalby on May 15th was sited in brushwood about the base of an alder (F.J.).

259. Peregrine Falcon.—One pair nested in the north-west, had the first clutch robbed, and reared one out of two hatched from the second clutch of three (H.W.B.).

K. Longstaff reports an unusual occurrence at Teesmouth on July 16th. Three large falcons disturbed from slag, separated and proceeded to chase waders and return to the tops of more distant slag heaps at intervals for some two hours. A Common Tern flew low over the water when chased and was not struck. First seen at a range of ten feet, they could be seen to have adult heads and breasts, with slate-grey backs. On July 23rd, J. P. Utley saw three Peregrines flying west over Coverham Abbey which may have been the same birds.

Odd birds were reported about several moors on various dates. A bird at Sandbeck on March 20th appeared on the day following the report of one missing from Hucknall Aerodrome (R.B.). Two birds were seen on the cliffs near Whitby on June 13th (P.B.) ; one near Cayton Bay in January (D.W., A.J.W.) ; and one at Bempton on March 27th (A.J.W.).

261. Hobby.—As a bird approached A.F.G.W. at Ripley Castle on May 7th he mistook it for a Swift until its larger size and longitudinally streaked underparts became obvious. 'The similarity to a Swift was amazing at long range.'

262. Merlin.—Pairs were known to breed on several of the western moors (R.F.D., P.E.D.) ; and in the north-east (J.L., R.S.).

A bird found with a broken wing by H. W. Bracken was kept in a box and fed upon rabbit and flew away strongly on the seventh day, the wing having made an effective false joint.

On September 4th, G. R. Edwards watched a Merlin rise from the ground, flutter at about six feet, then glide forward a few yards, alight, and repeat the performance several times. 'Was it a method of attempting to flush a crouching pipit?'

Merlins occurred at Topcliffe on February 15th, 18th, and March 1st (M. J. Ardley). One or two birds occurred near Kilnsea and Spurn in the spring months ; but much more frequently in the late autumn. H.O.B. recorded a bird at Flamborough on November 6th. A bird at North Dalton on June 17th was unusual (W. A. Butterfield).

263. KESTREL. A bird or two can usually be seen about the Spurn peninsula ; on a number of days in August and September southward movement was very noticeable. On September 26th (E.H., K.B.R., R.C.) several birds were seen to leave the Point for Lincolnshire. Redstart (R.Cr., K.S.) and Skylark (R.S., G.R.E., etc.) were recorded as food taken by Kestrels at Spurn.

Four pairs nested within half a mile of the centre of Batley, where it is unusual to walk the main street without seeing one (H.H.).

268. ROUGH-LEGGED BUZZARD.—A large hawk at Arkendale with rounded wings and feathered tarsi from January to mid-March was doubtless of this species (Miss C. M. Jameson), as was probably a bird seen quartering a moor north of Helmsley in the same period (A.G.).

269. COMMON BUZZARD.—In the north-west one pair reared three young ; and the single young of another pair disappeared mysteriously after being ringed (H.W.B.). The arrival of a Buzzard at Gouthwaite on November 6th caused an entire flock of 93 Canada Geese and various ducks to take off (A.F.G.W.). Two birds, found tied to a bough at Thwaite Bridge, near Hawes, on April 18th (P.E.D.) had been shot by some ignorant person.

271. MARSH HARRIER.—F. Childs reported a bird at Wassand late in August ; and birds believed to be of this species passed south at Spurn on August 30th (C.A.M.) and October 11th (J.A.C., A.M.).

272. MONTAGU'S HARRIER.—Birds were seen in the breeding season in more than one area on several occasions ; but breeding, although suspected, was not proved (R.M.G.). A Montagu's Harrier was seen in the north-west on August 19th and 23rd by J. R. Scott who knows the species well.

273. HEN HARRIER.—L. Carr had several reports of a bird thought to be a Hen Harrier in early March, about the Redmires area (near Sheffield). A bird was reported at Langdale End on November 9th (M. Johnson). A male was shot near Aldbrough on December 31st (G.H.A.). Single birds were reported at Spurn on April 14th, a male with no dark bar across the secondaries (M. and S.B.-S., P.A., G.D.) ; and on November 1st a female (R.F.D., P.E.D., D.B.I.).

[A bird seen at Spurn on September 14th occurred on a date when the Montagu's Harrier might be expected at least equally with the Hen Harrier ; but the observers who had ' good views ' of ' a very light-coloured hawk ' failed to give any reason for their diagnosis in the logbook.] The two species are often very difficult to distinguish.

275. GOSHAWK.—P. Young, who knows the raptorials very well, saw a large hawk at Ilton on November 1st which passed flying fairly low at 70 yards, followed by a Carrion Crow. When questioned his confidence was unshaken, and he summed up by describing the bird as ' just like an overgrown Sparrowhawk.' Carrion Crows not infrequently follow large hawks, probably with the hope of some fragments falling from the rich man's table.

277. SPARROWHAWK.—Mr. R. Tottie put up a Sparrowhawk from a still-warm, partly-eaten Woodcock on February 26th, 1949.

A bird ringed at Spurn by R.F.D. and R.C. on October 25th, 1947, was again in the trap on September 26th, 1949 (E.H., D.F.W., R.C.). Other odd birds were noted at Spurn in the autumn.

281. HONEY BUZZARD.—A bird was picked up dead in good condition early in June near Aberford and a complete wing, foot and some feathers sent to me by R. F. Wormald. The identification was also confirmed by R. G. Wagstaffe. A bird brought to the Dorman Museum, Middlesbrough, on June 2nd, had been shot by a gamekeeper at Skelton (O.C.H.)—' We'll teach these rare birds to be rare.'

284. OSPREY.—At Wintersett, during the first two weeks of January, 1949, a large hawk dived into the water and took fish regularly which it ate in a tree 200 yards away (D. Ayrton, Waterman, per A. C. Laughton).

289. COMMON HERON.—The Kiplin heronry has been abandoned. No notes are available from Moreby Park. At the other Yorkshire heronries occupied nests in 1949 were—Harewood, 11 (W.B., H.J.W.) ; Healaugh, 22 (W.B., K.D.) ; Slemingford, two, perhaps three (R.C.) ; Gilling, four (Rev. O.J.L.) ; Scampston, nine, one bird having a pink bill (R.M.G.) ; Hornsea Mere, 23 (F. Childs) ; Gargrave, 16 (H.J.W., J.A.C., C.N.). A few Herons on May 1st were flying with Rooks in the Whixley area, and three occupied Heron nests appeared in the rookery ; egg shells being found below (A.H. and M. White).

300. Whooper Swan.—Birds occurred in the early months at Gouthwaite Reservoir, maximum 17 on February 13th/14th (J.H., P.E.D., etc.) ; Swillington Ing, maximum nine from February 24th to April 4th (M.F.M.M., K.D.) ; Semerwater, 22 on February 18th (P.J.R.C.) ; and smaller numbers at Bolton Hall from January to mid-April (Lord Bolton) ; Chalker Reservoirs (W.F.F., H.J.W.) ; and Malham Tarn (P.F.H.). At Harewood one of the introduced birds had five eggs on May 17th but was robbed ; eight birds were there on November 6th (K.W.). In autumn Gouthwaite had 13 birds on November 6th (A.F.G.W.) ; Fewston, two on December 4th (A.P.).

301. Bewick's Swan.—Birds were recorded at Wintersett, one on February 7th ; at Mickletown Flash, one on January 9th (M.F.M.M.) ; at Fairburn, one on January 2nd (V.S.C.) ; and at Coniston Cold, one bird was identified on December 21st and the remaining 20 set down as probably of the same species (R.T.).

302. Mute Swan.—Out of seven cygnets hatched at Ripley in 1948 all survived until January 30th, 1949, after which several were killed, and the last chased from the water on April 16th. The old pair had three newly-hatched cygnets on June 18th but only one was left on July 6th. Mating was seen on the Lake on December 18th, whilst a watching juvenile imitated the raising and lowering of the heads of the adults, and uttered several high-pitched calls (A.F.G.W. and Miss C.S.).

303/307. Grey Geese.—It is extremely difficult to glean information from the dates and directions of flight of the various skeins and gaggles that flew over Central Yorkshire in the first and last three months of the year, except that there is considerable movement between eastern and western estuaries in Northern England ; and that parties occasionally come down at Swillington, and elsewhere. In the East Riding things are rather different concerning birds (mainly pink-feet) regularly moving between the upper Humber and the grazing grounds on the Wolds ; but after December G.H.A. says reports of such movements seldom reach him. Perhaps the 300-500 geese that flew north-west over Ilkley at 3-30 p.m. on January 9th, 1949, might supply part of the answer ; and the *c.* 200 that flew north-west near Methley on January 23rd. But even with such conspicuous birds as geese, only a small part of the movements that take place is seen and recorded. A large flock flying south-east over Northallerton on October 14th (J.P.U.) and over Thornton Dale on October 21st (R.M.G.) may have been connected with arrivals on the upper Humber ; which may not all come up river. Numerous smaller parties of unidentified geese have been recorded.

303. Grey Lag-Goose.—K. Wheater identified a gaggle of 12 at Harewood on September 24th.

304. White-fronted Goose.—An odd bird at Swillington Ing was seen on March 11th (M.F.M.M.), and on the 12th (D.L.).

307. Pink-footed Goose.—Birds were normal on the Humber ; arriving on October 1st (R.M.C.P.). See comment made concerning this species by G.H.A. cited under 'Grey Geese.' Odd birds were identified at Swillington Ing from February 20th to 23rd (F.R.A.). At Bretton single, occasionally two, birds occurred from March 5th to May 28th (J.C.S.E.).

311. Barnacle Goose.—Two birds were seen north of Kilnsea on October 29th by H. O. Bunce, who enabled several of those staying at the Observatory cottage at the time to get good views.

312. Brent Goose.—A bird consorted with the Canada Geese at Harewood on February 19th (K.W.) and at Ripley Park from March 27th to April 7th (A.F.G.W.) ; and at Swinton Park for a period prior to May 15th (J. P. Bradford) —whether it was the same bird at each place is conjectural. A pricked Dark-breasted Brent was at Bretton Park on April 23rd (J.C.S.E.).

314. Canada Goose.—Bred as usual in some numbers at Ripley and Swinton Parks ; and odd pairs at Swinsty, Harewood, Bretton, Fewston, Ilton, and elsewhere. In autumn and winter birds frequented the usual waters with Eccup Reservoir showing the largest number—134 arrived there on February 6th from north-north-west (K.B.) ; and on the 20th of December at Harewood Park were estimated at more than 200 birds (P.E.D., F.E.K.).

315. Sheld-Duck.—The increasingly regular inland appearance of this species is curious. At Swillington Ing up to three birds could be seen from February to December, including the breeding season, when M.F.M.M. reported two pairs on May 11th. Birds also occurred in the early months at Eccup, Gorple, Gouthwaite, Denton Park, Aldwarke S.F., Roche Abbey, and Lanshaw Dam (various ob-

servers) ; with three immature birds at Blackmoorfoot on August 30th (J.C.S.E.). Twenty-two flew south at Spurn on September 28th, and six more were on the estuary tide (E.H., R.C.) ; and smaller numbers were seen frequently. Two eggs were found in early May outside a rabbit-hole. Sheld-Ducks are scarce at Spurn after October and seem to have retreated further up the Humber ; but in the last week of December, 1949, several occurred (P.E.D.).

317. MALLARD.—Large numbers occurred on many waters in the winter months ; numbers exceeding 500 on many dates at Swillington Ing, and Eccup and Leighton-Roundhill Reservoirs, and on the upper Humber.

318. GADWALL.—A few birds occurred in the early months at Swillington Ing and Coniston Cold ; and in autumn at Swinsty (H.H.), Swillington (various observers) and Coniston Cold (R.T., A.P.).

319. TEAL.—The largest numbers recorded were—several hundreds on Whitton Sands on March 20th (A.F.T.), and *c.* 400 at Swillington Ing on November 6th (K.B.). On all waters numbers became few in late April.

322. GARGANEY.—There was no breeding record ; but odd birds, usually males, occurred at Swillington Ing in early May (K.B., D.L.) and in August (K.D., B.S.) ; and at Fewston in both months pairs were seen, with a pair on Mickletown Flash on May 25th ; and at Fairburn up to two pairs occurred in May, with five on August 1st (M.F.M.M.). None occurred outside those two months.

323. WIGEON.—The species was well spread in the winter months over most Yorkshire waters ; with maximum numbers up to 200 and more at Gouthwaite, Swillington Ing, Hornsea Mere, and at Spurn ; and as far up the Humber as Brough. A pair was at Fairburn on May 25th, and three birds on August 1st (M.F.M.M.). August 28th was the earliest date for a bird at Swillington Ing (K.D.), and at Ripley Park Lake (A.F.G.W.).

325. PINTAIL.—Wintersett, Coniston Cold, Ripley Park, Eccup, Swillington Ing, Fewston, are the names of inland waters where a few birds were seen. Seven at Swillington on February 27th (K.D., F.R.A.), and on March 12th (D.L.) ; and the same number on December 11th and 27th (K.B.) were the maxima.

326. SHOVELER.—The Shoveler bred at Swillington where there were eight ducklings a few days old on June 18th (B.S.) ; and probably at Fairburn. Birds also occurred at Wintersett, Altofts, Coniston Cold, Eccup, Clervaux Castle Lake, Ripley, Lindley and Fewston Reservoirs, Farnley Lake, and Bolton Hall, where a pair remained all summer. There were 26 at Swillington Ing on April 19th and *c.* 70 on October 16th (K.B.) ; and *c.* 20 at Ripley on October 22nd (A.F.G.W.).

328. POCHARD.—The species frequented most of the deeper inland waters out of the breeding season. Forty-eight were counted at Wintersett on February 14th (Wakefield N.S.). There were 20-30 at Fewston on January 23rd (J.P.B.), and 21 on February 19th (M.F.M.M.). At Malham Tarn numbers increased in the autumn to *c.* 90 from November 18th (P.F.H.) ; and there were 59 at Coniston Cold on December 31st (R.T.) ; with *c.* 50 at Harewood on December 20th (F.E.K., P.E.D.). *c.* 97 at Swillington on December 11th was the maximum there and had become *c.* 40 on the 31st (K.B.).

330. TUFTED DUCK.—One or more pairs bred by a number of waters. An autumn flock of 23 birds arrived at Coniston Cold on September 11th and increased to 56 by October 6th (R.T.). At Malham Tarn 48 birds arrived on July 3rd, increased to 113 by October 27th, and by November 26th had dropped to 55 (P.F.H.). At Swillington Ing with *c.* 30 there in August, birds numbered 42 on September 10th and had dropped to *c.* 20 on October 8th (K.B.). At Fairburn Tufted Ducks numbered *c.* 300 on March 23rd (B.S.). On most waters birds never equalled any of the foregoing citations.

331. SCAUP.—A pair occurred on a pond between Skelton and Saltmarshe (Ouse) on March 20th (A.F.T.). Two males occurred at Swillington Ing from July 31st to August 2nd (K.B.) ; and there was a female there on September 5th (B.S.). There were single birds at Spurn on October 13th (H.J.W., A.M.), and on October 20th (G.R.E., R.S.).

332. GOLDENEYE.—The species frequented many waters in the early and late parts of the year. A bird stayed at Ogden Reservoir until May 16th (I.M.) ; and there was a ' redhead ' in the Washburn Valley on April 30th (M.F.M.M.). At Eccup the last birds seen were 19 on April 23rd, and nine had returned on October 12th (M. and S.B.-S.). A bird at Withens Res. on August 17th (G.R.E., A.M.)

was the earliest of autumn. Numbers varied on most waters from one or two to a dozen or more.

337. Common Eider.—Two were fishing at Scalby (Scarborough) on December 16th (R.M.G.).

339. Common Scoter.—There were *c.* 100 off Dane's Dyke, Bridlington, on January 24th (H.F.W.); and a similar number on October 30th off Atwick Gap (J.B.W.G.). At Spurn, where parties often pass, the maximum number seen was 90 on October 7th (E.R.P., I.J.F.-L., etc.). Twenty-seven Scoters arrived at Swillington Ing from west at 16.30 hours on August 27th, and flew back westward in ten minutes (K.B.). Twenty-two birds were on Semerwater on December 26th (J.P.U.). A few birds were seen elsewhere, on the coast, and inland. If anyone has any unreported record of any Common Scoters anywhere in Yorkshire between May 1st and July 20th in any year, I should be obliged for details (R.C.).

340. Velvet Scoter.—A single immature or female bird gave good views on July 17th to H.O.B. There was one near Atwick Gap on October 30th (J.B.W.G.). Single birds occurred off Spurn on September 11th and 12th (R.F.D., H.O.B., R.Cr., etc.).

342. Goosander.—This species appears to visit the county more numerously and generally than some years ago. Most occurrences are on waters adjacent to the Pennines. At Stocks Reservoir 45 birds included 13 adult males on March 27th (R.F.D., P.E.D.). At Eccup, 47 on January 30th was the largest number recorded (K.B.). No other water showed more than a few birds or odd ones excepting Hornsea Mere where there were 21 on the frozen water February 6th (K.F.); 12 on December 18th; 18 on December 24th (J.W.B.); and 35 there on December 31st (E.C.). Waters watched infrequently include Strines Reservoir, two on October 30th (A.F.T.); Hury Reservoir, three females and one male on January 9th; whilst on the 10th at Semerwater, four birds had the sexes reversed (A.B.). In the Halifax district the species had not been recorded since 1842 until a bird occurred on Walshaw Dene top reservoir on February 20th (G.R.E., H.J. Group). A bird at Roundhill Reservoir on May 2nd was late (P.Y.).

343. Red-breasted Merganser.—Five birds were recorded near to Kilnsea on October 31st and one on November 1st (A. R. Summerfield). There were two, perhaps more, at Teesmouth, on April 3rd (A.B.).

344. Smew.—All the birds recorded were seen inland. At Gouthwaite a female was seen on January 1st (R.M.G., J.L.), and on several dates in February. On Lindley Reservoir a male and two females displayed on March 9th (R.F.D., P.E.D.). At Farnley Lake a female occurred on March 9th and 25th (R.F.D., P.E.D.). Eccup Reservoir showed a pair on January 29th and 30th (F.R.A., K.B.), and single birds occurred at Ripley on January 9th (A.F.G.W.), and at Swillington on January 1st (G.R.E. and H.J.G.) and on February 12th (D.L.).

346. Cormorant.—The usual odd birds turned up on a few of our inland waters. One at Swillington on April 10th came from east, was in breeding plumage, dived repeatedly to escape the attentions of a crowd of hovering Black-headed Gulls; and left west-south-west (K.B.). The Hunt Cliff colony consisted of *c.* 35 pairs (C.N.). Twenty-four pairs nested below Ravenscar on May 14th, and the Gristhorpe colony maintained its numbers (A.J.W.). A colony north of Staithes numbered *c.* 60 birds on August 6th (O.C.H.).

348. Shag.—A bird was wing-drying at Robin Hood's Bay on March 20th (F.R.A.). Odd birds frequented the Bempton Cliffs all summer (A.J.W.).

At Flamborough, K. Fenton and H. Goodall saw a Shag on May 19th. On June 29th an adult and an immature bird stood on exposed rocks and were joined by others until eight adults and 20 immature birds were counted. K.F. has no doubt the young birds had been hatched nearby, probably in a cave or underhang.

349. Gannet.—Five was the most seen at one time at Bempton (A.J.W., C.F.P.). H. Pease watched a pair at a nest on June 28th. M. Darlow thought there were three pairs. A. J. Wallis reported only one young bird known to have been reared—after a first nest had been lost. E. W. Taylor saw a bird still sitting on August 7th.

Passage up the coast in spring and down in autumn was normal. A bird was reported to have been picked up dead on the school playing fields at Leyburn in August (J.P.U.).

355. Manx Shearwater.—A single bird at Spurn on April 22nd approached to within 200 yards of the shore (R.S.P., A.H.W.). On September 18th a bird flew north, three miles at sea off Filey (M. and S.B.-S.).

368. Fulmar.—Young birds unable to fly were noted at Cloughton Wyke, Castle Cliff, Scarborough ; and on several other cliffs in the neighbourhood ; and all along the Speeton and Bempton cliffs. H. J. R. Pease estimated more than 30 pairs between the East Riding boundary and Gristhorpe Bay. From the first available chalk cliffs south of Filey Bay, to Sewerby, the cliffs were well tenanted (G.H.A.). Pairs occupied many sites from Port Mulgrave and Staithes to Skinningrove (R.S.), and at Hunt Cliff (C.N.).

370. Great Crested Grebe.—The long drought brought water levels low and Grebes suffered considerably, particularly those that would have bred by reservoirs. Many pairs had their first and second nests stranded, but some succeeded at a third attempt, so that more young birds eventuated than seemed likely at the normal time. Other pairs vacated water which had shrunk far below the levels of the water plants. In the spring some 85 birds frequented 22 waters and eventually some 40-50 young were produced. Fairburn Flash was the most successful breeding place with at least ten pairs breeding ; and four broods were produced at Hornsea Mere. A white bird appeared for a time on Ripley Park Lake ; and was similar to a bird there in 1948 (A.F.G.W.).

371. Red-necked Grebe.—A bird at Swillington Ponds on September 25th was watched in detail through a high-powered telescope (V.S.C., I.M.). Good views were obtained of a bird on Hornsea Mere on April 2nd and 3rd, which had the yellow base to the black-tipped bill and other typical features (G.H.A.).

373. Slavonian Grebe.—A bird at Swillington Ing on August 31st still showed the ' summer ear-tufts,' but had winter-white flanks (B.S.) ; and was also seen on September 2nd (P.E.D.).

374. Black-necked Grebe.—Six were on Fairburn Flash on January 2nd and 9th (V.S.C., etc.). J. C. S. Ellis recorded an adult at Blackmoorfoot Reservoir on April 16th. Birds occurred at Swillington Ing on several dates in late April and early May (K.B., R.C.) ; and two birds were there on August 4th and 20th (K.B.), and on the 21st (K.D. and B.S.). A bird on Malham Tarn still showed breeding plumage on December 23rd (R. S. R. Fitter).

375. Little Grebe.—Again approaching pre-1947 numbers in some places—*c.* 20/30 at Swillington Ing on several dates in August and September (B.S. and K.D.).

376. Great Northern Diver.—Three birds with dark heads at Spurn on May 16th were thought to be of this species (R.C., A.L.C.). On December 12th, Mr. J. Blackburn brought me a bird he had found on a wet road on Mowbray Hill, near Masham, during stormy weather. It measured 32 inches from tip of bill to end of tail, with wings of $14\frac{5}{8}$ inches, slightly decurved bill from nostrils 70 mm, and tarsus 84 mm. It was in winter plumage (R.C.). A bird occurred at Scarborough Harbour on December 16th, 17th and 28th (R.M.G., A.J.W.).

378. Black-throated Diver.—A bird believed to be of this species was seen at Hornsea Mere on April 2nd, a more bulky, heavier bird than the red-throated, with a straight bill, black at sides and base of neck, and dark-grey back slightly flecked white (E.C.). Unless an immature bird one would have expected evidence of breeding plumage to be showing at this date. A bird at Spurn on August 30th was probably of this species (E.C., J.W., M.B.-S.).

379. Red-throated Diver.—Divers pass at sea off the coast not at all infrequently, but are often too far out for an observer to be sure of the species even with the aid of binoculars and telescope. Fewer were seen in 1949 than normal. A bird on Hornsea Mere on January 1st clearly showed the tip-tilted bill of this species (G.H.A.). One was viewed off Filey Brigg on March 10th (H.J.R. Pease). Four birds at Spurn on October 9th came close inshore (C.A.M., P.A.). Eight birds that were recorded on October 12th in the Observatory roll-call were most probably red-throated, but should have had reference in the ' log.' Birds of this species appeared about Scarborough from October 29th onwards and gave the impression of being unusually numerous (A.J.W.). On March 20th a bird occurred at Teesmouth where the species was not noticed on visits paid in autumn (A.B.). A dead (oiled) bird was found on Redcar sands on December 11th (K. Longstaff).

380. Wood Pigeon.—A bird ringed at Blagdon, Northumberland, on 19/9/48 was recovered at Skelton (48 miles south-east) in January, 1949 (E.P.L. in *British*

Birds). Exceptionally large flocks of 1,000+ roosted nightly in autumn in woods near Easingwold and Haxby (F.J.).

381. Stock Dove.—The crop of a bird on April 2nd was full of sprouting peas and beans (P.B.). A bird at Gorple had two eggs in the reservoir valve house on September 4th (G.R.E.). A dove that was definitely not Turtle Dove rose from two eggs on a lattice nest in hawthorn on June 17th. The bird perched for a full minute and was examined through binoculars at 30-40 yards (N. M. Hepworth).

383. Turtle Dove.—Birds occurred at Spurn on a few days in May and June ; but one on August 14th was the only autumnal record. The species nested in two localities near Loftus-in-Cleveland (R.S.) ; and tends to extend higher up the western dales.

386. Bar-tailed Godwit.—Thirty birds were recorded at Spurn on January 22nd (M.F.M.M.) ; but subsequent numbers were very small, in autumn an odd bird or two could be seen on most days. At Teesmouth, *c.* 200 were generally present until March 20th, after which few were seen until May 7th (A.B.). In autumn parties up to *c.* 60 birds were usually present in August, and on September 17th there were *c.* 250 after which numbers dwindled to *c.* 100 on December 27th (A.B.). A bird passed east over Swillington on May 13th (K.B.).

387. Black-tailed Godwit.—The wing-bar and projecting feet were noted of a bird at Swillington Ing on May 7th (K.B.).

388. Curlew.—Present throughout the year in fair numbers at Spurn ; but numbers are usually much greater at Teesmouth. The species showed continued tendency to breed on the lower ground in many areas.

389. Whimbrel.—Three Whimbrels on Witton sands on March 20th may have been early migrants or wintering birds (A.F.T.). South-bound birds were noted at Ilton, three on August 22nd (P.Y.) ; and at Swillington Ing on August 5th (K.B.) ; at Bridlington on August 13th (H.F.W.) ; and near Malham Tarn on September 14th (P.F.H.). At Spurn a few birds occurred from April 29th to May 23rd ; and more from July 30th to September 19th, with maximum *c.* 40 on August 15th (G.H.A.). The period of passage was similar at Teesmouth with *c.* 15 on August 13th as the maximum (A.B.). A bird was seen on Filey Brigg on October 11th (H.J.R.P.).

393. Woodcock.—Birds occurred in autumn at Spurn as usual, with the first on October 6th. Roding at Malham continued from March 27th to June 7th (P.F.H.). An adult was seen by G. W. Wrangham to return to small young and remove one in her feet.

394. Great Snipe.—A bird came over with grouse during drives several times in September, which Lord Bolton thought to be a Great Snipe and so took binoculars up and identified it to his satisfaction.

395. Common Snipe.—There were *c.* 120 at Gouthwaite on August 21st on mud uncovered by the drought ; and at Swillington Ing incoming birds increased from *c.* 20 present on July 26th to *c.* 100 on August 17th, and to *c.* 150-200 on August 27th (B.S., K.B., D.L.)—the snipe frequented marshy parts that followed drainage due to repair of the old breach in the Aire bank.

398. Jack Snipe.—The species had reached Keld Head on October 5th (R.M.G.). Odd birds occurred at Spurn on October 7th, 9th, 27th, 29th, 30th and November 1st ; at Elland S. Works on October 22nd (R.Cr.) ; and near Croft (Teesdale) on the 29th (I.D. Dougill).

402. Turnstone.—There were two birds at Swillington on May 13th (B.S.) and one on the 19th (K.B.). At Teesmouth and Spurn a few birds, sometimes in good parties, were usually present ; with maximum numbers at Teesmouth *c.* 50 on August 13th (A.B.), and at Spurn *c.* 200 on August 17th (G.H.A.).

403. Knot.—Two occurred at Swillington Ing on September 25th (V.S.C., etc.). Birds present at Spurn on January 22nd were estimated at *c.* 3,000 ; and very few were left by March 19th (M.F.M.M.). Numbers at Teesmouth were smaller than at Spurn at most seasons except in spring when *c.* 300 on April 23rd and *c.* 150 on May 7th were visible (A.B.).

404/5. Dunlin.—A bird ringed 20 miles south-south-west of Stavanger, Norway, on September 12th, 1948, was shot near Patrington on February 12th, 1949 (G.H.A.). Several pairs nested on high ground above Baldersdale (G.H.A., J.R.S.), and on moors farther south. The species was normal in its appearances by inland waters ; and at Teesmouth and Spurn.

406. Curlew Sandpiper.—Three birds occurred by Redmires Dam, Sheffield, on August 19th (A.F.T.) ; and one at Swillington Ing showed its white rump on September 13th (M. and S.B.-S.).

Occurrences noted at Spurn were extremely few—two on October 1st and one on the 2nd (J. Hyatt, C. Mylne). At Teesmouth, birds were noted—one, August 28th ; two, September 6th ; seven, September 17th, including one adult ; and one, September 24th (A.B.).

407. Little Stint.—Two birds were at Spurn on August 13th (G.H.A., A.McA.) ; and one at Filey Brigg on September 18th (A.J.W.).

409. Temminck's Stint.—One of two Stints at Swillington Ing on August 23rd had the characteristic tail of this species ; and the trilling call was definitely not Little Stint (B.S.). A single bird was observed at close quarters at Cherry Cob Sands on August 29th and September 1st, feeding and preening, alone, and with a Green Sandpiper (H.O.B. and L.S.).

415. Purple Sandpiper.—Occurred as usual in small parties about the more rocky parts of the coast. Eight were still at Bridlington on May 8th (H.F.W.). Single birds were seen at Spurn on April 24th, May 9th, September 8th and October 31st ; at Teesmouth on October 1st and November 12th.

416. Sanderling.—The maximum, *c.* 50, was noted at Spurn on September 6th ; at Teesmouth, *c.* 300 on July 29th and September 6th. Two occurred at Fly Flatts Reservoir on May 21st (R. Crossley). Of three at Gouthwaite Reservoir on May 28th, two were in winter plumage and one in breeding dress (A.F.G.W.).

417. Ruff.—Two birds at Swillington Ing on January 26th showed typical winter plumage with ' pheasant-like ' backs (K.D., F.R.A.). On January 22nd and 29th D. Leaver reported three Ruffs there. A bird occurred north of Kilnsea from April 28th to May 1st (R.M.G., R.F.D.).

Rather fewer birds were reported in autumn than usual. A bird at Spurn on July 3rd (G.H.A.) was early. At Swillington Ing two Reeves were noted on August 16th and 19th and one on the 23rd (B.S.) ; K.B. saw one there on the 17th. A Ruff and a Reeve occurred at Teesmouth on September 6th (A.B.) ; and single birds at Dewsbury S. F. and Osset S. F. in August (J.C.) and at Hornsea Mere in early September (G.H.A., A.J.W.).

421. Common Sandpiper.—The Halifax Junior Group reported, and G. R. Edwards verified, a bird by the Calder near Halifax on January 6th.

The earliest reported arrival occurred on April 14th at Wintersett (W.N.S.) The species is showing a tendency to breed in more level country by ' flashes'. and sewage farms. *c.* 20-25 flew in a party at Swillington on August 2nd, where the species was last seen on October 16th. A bird seen at Wassand on November 27th by J. B. W. Gardiner could have been no other than this species, and it, or another, was also seen on December 18th (G.H.A.). A bird occurred at Spurn on October 21st (G.R.E.).

423. Wood Sandpiper.—A. F. Taylor watched a bird at close range at Redmires, Sheffield, on August 14th ; and B. Speake one at Swillington Ing on August 21st and 26th.

424. Green Sandpiper.—Two birds occurred at Wansford on January 16th (H.O.B.) ; and one at Ben Rhydding filter beds from April 24th to May 1st (W.F.F., H.J.W.). Single birds occurred at Spurn on April 25th and 26th (R.M.G., G.H.A., C.A.M.) ; and a fair number passed inland in autumn from July 30th to September 13th.

Autumnal occurrences by inland waters was normal ; but birds have been noted on several unusual dates. At Eccup birds were reported from early January to March 3rd (K.B., G.R.E., M. and S.B.-S.) and again on November 2nd. In late summer the Green Sandpiper occurred more frequently than usual. Another late bird occurred at Rodley S. W. on November 16th ; and one at Horsforth S. W. on October 31st (P.E.D., R.F.D., D.B.I.). Up to three birds remained near Thornton Dale until December 21st ; and on the 24th there were two at Keld Head (R.M.G.).

428/30. Redshank.—Maximum number present on one day at Teesmouth, *c.* 100 on September 17th (A.B.) ; at Spurn, *c.* 100 on October 31st (R.F.D., G.H.A., etc.). A nest on mud of a Rotherham Sewage Works lagoon was completely exposed until grass grew and partly concealed the four eggs.

431. Spotted Redshank.—A bird at Swillington on August 27th, September 3rd and 4th called typically (K.B.). One at Dewsbury S. F. on September 7th

had no wing-bar and allowed inspection through a telescope at 25 yards range (J.C.). Single birds occurred at Spurn on five occasions between September 7th and October 2nd.

432. GREENSHANK.—A bird occurred at Swillington Ing on April 3rd (V.S.C., etc.) and one on April 24th (M. and S.B.-S.). From August 1st to October 15th Greenshank were noted at Swillington Ing, Altofts, Eccup Reservoir, Malham Tarn, Redmires Dam (Sheffield), and Stone Creek (Humber) on various dates by several observers. At Spurn never more than two birds were recorded, on seven occasions from July 30th to September 3rd, with one on October 8th.

435. RINGED PLOVER.—The species bred between Whitby and Sandsend ; three young were seen on June 9th (A.B.W.). Eggs were laid at Teesmouth but it is doubtful if young were reared (A.B.). Many nests were robbed or destroyed at Spurn and no young birds were seen except at the Point (G.H.A.). Odd birds and small parties were often seen by inland waters. At Teesmouth the maximum in autumn occurred from August 13th to 20th with *c.* 200 birds (A.B.). At Spurn *c.* 100 birds on September 11th was the largest number seen (R.S., R.F.D., R.Cs.).

438. LITTLE RINGED PLOVER.—One pair certainly, two pairs probably, a third pair possibly, perhaps even a fourth, bred in Yorkshire in 1949.

Four adults were seen in one area. Eggs were seen on May 22nd in a nest which held two chicks and one egg on June 6th, and which was empty on June 8th ; but no young were subsequently seen thereabouts which could have resulted from that laying. Whether chicks seen on August 2nd and 3rd had resulted from a second laying of the same pair of birds as is probable, or from the breeding of a second pair as is possible, remains in doubt (F.R.A., K.B., K.D., D.L., M.F.M.M. and B.S.).

A pair of birds at a place some miles from the first nesting-site called and behaved as if they had young on June 18th and 19th ; but young could not be found (M.F.M.M.). A bird without a wing-bar was seen on May 16th from a railway carriage window, by water distant from any of the other known areas (M.F.M.M.). Fuller details have been sent for publication in *British Birds* at the same time as the account of breeding elsewhere in England is published.

440/441. GOLDEN PLOVER.—Breeding occurred normally on many of the higher moors. H. Margoram reported *c.* 1,000 birds at Riffa (Wharfedale) on March 24th. *c.* 50 in Wharfedale on May 14th, with very black and white fronts appeared to be ' Northern ' birds (R.S.P.B.). A field by the Calder near Ossett had 87 birds on April 3rd, 152 on the 15th including 51 evident Northerns, and 127 on April 20th including 20 Northerns (J.C.). There were some very contrasty birds at Blackmoorfoot in May (J.C.S.E.). Flocks varying from 250 to 450 remained about Fly Flatts Reservoir during the early months.

The congregation on Harrogate Stray in autumn increased by stages from *c.* 20 in early October to *c.* 500-600 on December 24th (A.F.G.W.). About Redmires (Sheffield) *c.* 300 on November 6th was the largest number seen (A.F.T.). Large parties (*c.* 200) passed south-south-east at Swillington Ing on October 16th (K.B.). There were *c.* 800 near Methley on December 1st in a field occupied at night (P.B.). *c.* 250 were at Fly Flatts on October 30th (C.N.). The largest number near Spurn occurred on March 14th—*c.* 120 (A.J.W.).

444. GREY PLOVER.—A bird with black axillaries led a large flock of *c.* 450 Golden Plovers at Fly Flatts Res. on January 23rd (G.R.E. and H.J.G.).

At Spurn the maximum number (*c.* 250) occurred on September 10th (R.S., C.E.A.B., R.M.G., etc.). *c.* 150 on October 1st was the largest number recorded at Teesmouth (A.B.). Birds were present at Spurn until April 24th and from August 13th.

449. LAPWING.—Persuasion to the farmer to delay rolling helped four nests to hatch in one field west of Sheffield (A.F.T.). Breeding stocks in some areas continue to decrease. A bird ringed in West Yorkshire near the Lancashire border on 17/7/48 by K. G. Spencer was recovered in County Meath on 16/2/49.

In Holderness, autumnal flocks were smaller than in former years (G.H.A.) ; but large numbers occurred elsewhere. A field near Pool showed *c.* 500 birds on July 17th (P.E.D., R.F.D.) ; and there were *c.* 1,000 at Dishforth Aerodrome on July 17th (K.B.). On Harrogate Stray a flock estimated at *c.* 1,500-2,000 birds on December 8th was the largest A.F.G.W. had ever seen on the Stray. Gospool Aerodrome showed *c.* 1,000 on Deeember 27th (A.B.). Very large winter flocks occurred in the Earswick area (F.J.).

R.M.G. instigated prosecution of one who had shot a Lapwing on Good Friday (April 15th) and who was fined at Pickering Police Court.

452. Oyster-catcher.—The species nested in Swaledale where A. Baldridge saw eggs on May 28th and young on June 5th. Breeding was also proved in Airedale where one bird laid three eggs in a hollow in the six-foot way of the main line between Skipton and Gargrave, and was eventually killed by a passing train (A.T.). Other pairs bred in the neighbourhood and near Austwick. The species has bred in others of the Dales. At Spurn a pair produced eggs (J.W.) which were destroyed (G.H.A.). Parties at Teesmouth reached *c.* 100 on August 28th, and *c.* 80 on September 24th, and then dwindled to very few. Smaller numbers passed at Spurn.

462. Black Tern.—One on September 5th, and three on the 6th (R.M.G., C.E.A.B., R.F.D.) were the only Black Terns recorded at Spurn.

Four at Fairburn on May 11th were the only birds reported in spring (M.F.M.M.).

In autumn, birds occurred—at Malham Tarn, one on August 18th (P.F.H.); at Swillington Ing, four on September 5th (B.S.); and single birds on September 7th, 10th, 11th, and 17th (M. and S.B.-S., H.H., K.B., D.L., K.D., G.R.E., and the H.J.G. members).

467. Sandwich Tern.—Birds passed up and down the coast as usual. At Teesmouth, April 23rd (A.B.), at Spurn, May 8th, were the earliest dates recorded. In autumn the last seen occurred on September 17th at Teesmouth (A.B.), and on October 6th at Spurn; with a straggler on October 25th (G.R.E., R.C., etc.). Seventy-five were estimated as seen on September 9th (R.M.G., R.F.D., etc.).

468. Roseate Tern.—A juvenile picked up at Teesmouth on August 7th had been ringed on July 21st on the Farne Islands.

469/70. Common and Arctic Terns.—First noted at Spurn on April 16th, and last on October 4th, with *c.* 100 on September 1st (E.C., M.B.-S.). At Teesmouth the first was noted on April 23rd (A.B.).

Inland, birds occurred—one Arctic at Fairburn on May 4th (M.F.M.M.); one at Aldwarke S. F. on May 7th (R.B.); at Swillington Ing, three on May 17th, one on May 20th and two on the 21st (K.B.). In autumn occurred one Common Tern at Elland on July 16th (R.Cs.); four at High Royd on August 8th (A.M.); two at Eccup on September 28th (M. and S.B.-S.); one near Brough (Humber) on October 28th (P.E.D., J.K.F., D.B.I.).

471. Little Tern.—At Teesmouth at least 12 birds had eggs on June 4th (A.B., K.L.); most were robbed; but on July 26th, with *c.* 50 birds present, several flying juveniles were being fed by adults which dived down at intruders as above nesting-ground (C.N.). The species was last seen there on August 18th (A.B.).

Little Terns were first seen at Spurn on April 23rd (A.H.W., R.M.G., etc.). Over 30 pairs attempted to breed at the main colony but no young were found there, the site being over-run with trippers. The birds that nested close to the Point had a somewhat better time, and G.H.A. caught 18 young and ringed them, and a few more could fly well enough to avoid capture. This improvement was due to the work of those who gave up their week-ends to patrol work, asking visitors to keep away from the ternery, including G.H.A. and Mrs. Ainsworth, and R.F.D. Volunteers for such work next early summer are requested. The terns were last seen on August 17th, excepting a straggler seen on September 5th (R.M.G., R.F.D., etc.).

A Little Tern appeared on the Wharfe near Otley on October 23rd, and was watched at distances down to six feet as it plunged for food; and twice when it settled on some waterside stone steps. The bird had a dark bill with yellowish base, dull yellow legs, white-forked tail and underparts, with some darker fleckings on the upper surface of light grey wings. The date is the latest known for a Little Tern in Yorkshire (C. Nelson). Birds abnormal as to time are often also so as to place.

477. Little Gull.—An immature bird was seen flying north at Spurn on March 1st (R.F.D.). On November 19th at Swillington Ing, two adults and two immatures, with Black-headed Gulls present for comparison, hawked just above the water. The immatures occasionally uttered a short, high-pitched note which the observer (K. Brown) rendered as ' squit.' The adults had dark underwings; the immatures light with dark axillaries. The upper wing pattern of the juveniles was very striking, with broad dark-brown band from the primary tips extending

the whole length of the wings, and a broad terminal band to the white tail. The flight and behaviour were reminiscent of the Black Tern (K.B.).

478. Black-headed Gull.—Parties have attempted to colonise many remote parts of the moors in recent years, only to be driven away by local persecution. About 100 young were on a moor near Keld on June 26th (P.J.R.C.). At the new colony at Aldwarke S. F., near Rotherham, a count gave *c.* 700 birds on May 7th ; and later many young were seen running about the mud islands. The manager of the S. F. collaborated in giving the birds protection (R.B.). A bird that had been ringed on the Swedish Island of Götland on 6/6/48 was found oiled at Hornsea Mere on August 29th, 1949, by R. W. Mackey, of Beverley Grammar School.

A bird in Whitby Harbour on December 31st, 1949, had an almost complete hood, rather more slatey in colour than usual (C.E.A.B.).

482. Herring Gull.—Over 2,000 were roosting nightly at Eccup in December (M. and S.B.-S.). A bird that had been ringed on 25/6/49 in Nordland, Norway, was found injured near Easington by Rev. L. A. Erving on 29/10/49.

Three hundred and seventy were counted at Swillington Ing on December 24th, increasing to 600-700 at dusk (K.B.).

484/485. Lesser Black-backed Gull.—Odd pairs tried to nest on one or two Pennine moors, as amongst Black-headed Gulls near to the Lancashire border. *c.* 35 were at Eccup on November 23rd and were mainly *graellsii* (K.G.S.). A pair were seen on a nesting ledge at Boulby in May, 1949 (R.S.). There were three or four among the nesting Herring Gulls at Kettleness on July 9th but none alighted on the cliffs (J.H. and A.B.). The species is uncommon on the Yorkshire cliffs.

Birds of the Scandinavian race have occurred—one at Bridlington on August 31st (J.C.) ; two at Eccup on December 20th (M. and S.B.-S.) ; one at Wilstrop, York, on December 27th (R.Cs.) ; one at Swillington Ing on January 2nd (F.R.A.) ; two on January 16th ; one on January 30th and one on December 27th (K.D.) ; and one on Harrogate Stray on January 18th ' probably ' (A.F.G.W.). This race was noted at Spurn on several dates in spring ; and on October 19th (C.A.M., G.R.E., etc.) ; and at Hornsea Mere on August 16th (K.F.).

486. Great Black-backed Gull.—The species reached its maximum at Teesmouth with *c.* 300 on September 6th (A.B.) ; and at Spurn with *c.* 500 on the 10th (R.F.D., R.C.). The usual small numbers occurred about some inland waters ; without pressure from severe weather, e.g., *c.* 20 at Eccup on November 23rd (K.G.S.).

487/8. Glaucous Gull—Iceland Gull.—A bird at Eccup on January 29th had stained wings and was seen bathing and in flight. It was only slightly larger than a Common Gull with creamy plumage and flight more buoyant than the Herring Gulls and was considered an Iceland Gull (K.B.). A bird rather larger than the Herring Gulls it consorted with at Spurn on April 5th had no black on primaries, and was of uniform buffish-white plumage, and was thought to be a Glaucous Gull (E.C.) ; and a similar bird was noticed on April 15th ' adjudged to be about the size of a Herring Gull ' (M. and S.B.-S., P.A., G.D.). H. J. R. Pease reported an adult Glaucous Gull at Filey on January 19th, and an immature bird on February 5th, concerning which a local fisherman told him that ' locust ' gulls had been about for some days. An immature Glaucous Gull in Scarborough Harbour on February 9th had a much fiercer expression than the gentler look of a neighbouring Iceland Gull. Can that be diagnostic? (R.M.G.). There was an Iceland Gull there on February 25th (H. J. R. Pease).

489. Kittiwake.—A very tired Kittiwake alighted on the Calder at High Royd on February 27th and was watched from a few yards (G.R.E.). A pair of Kittiwakes attempted to breed on the sea-wall at Bridlington behind the fish docks (M. Darlow and Bridlington Press).

491. Great Skua.—A large bird that passed at Spurn on October 19th displayed no ' wing flashes ' ; but was uniformly dark and of Skua form and was probably a juvenile (G.R.E., P.A.H.). Young Great Skuas are not easily distinguished as they fly out over the water from the juvenile Great Black-backed Gulls of which there are so many about the Yorkshire coast in autumn. J. B. W. Gardiner reported a bird at Barmston on September 4th without comment !

493. Arctic Skua.—A bird was reported at Barmston on September 4th (J.B.W.G.). Two birds were seen at Spurn on September 4th and odd birds on

several days to October 11th. Dark-form Arctic Skuas occurred at Teesmouth, one on August 4th, three on the 9th, and one on September 24th (A.B.).

498/499. GUILLEMOT.—A bird found dead on the Spurn beach on December 28th was of the Northern race (P.E.D.). Breeding birds at Bempton were late and below usual numbers (C.F.P.).

502. LITTLE AUK.—A Little Auk was found near Gorple on November 8th (E.W.W., W.G.). At Filey there were four in the Bay on November 15th with one dead on shore; and five were stranded, alive and not oiled, on the 20th (H.J.R.P.). At Spurn, one was caught ashore, and several reported on the sea on November 23rd (H.O.B., R.S.-P.). A dead bird was found near Grosmont on November 16th where it had been alive a day or two before (C.E.A.B.). The period covered was one of gales and rain.

504. CORNCRAKE.—Nests were known at two places in the Craven area (C.A.C. and 'Dalesman.'). Birds were heard in the breeding season in Arkengarthdale, near Skipton, Hebden Bridge, Sedbergh, Ackworth, Rivelin, near Sheffield, in Wharfedale, Wensleydale, Swaledale, and near Whitby and Loftus. In most cases only a single pair or bird was concerned. On May 7th a Corncrake was seen at Spurn near to the trap (G.H.A., C.M.).

509. WATER RAIL.—The species occurred more frequently than usual, in most of the winter months and a number of areas, including Swillington Ing, Burley, Farnley, High Royd, Hornsea Mere, and near Sheffield, Darlington, Bickley and Masham. At Spurn, where birds had been seen on several dates in the early months, April 24th was the latest. Two birds came to grief there on October 6th—against the lighthouse and against a car travelling at night (I.J.F.-L., R.C.). May 26th and later at Malham Tarn (P.F.H.) were the only dates to suggest possible breeding.

510. MOORHEN.—The 16 eggs in a nest near Wakefield were of two types and doubtless of dual parentage. A Moorhen sucked an egg of a Black-headed Gull at Altofts on June 5th, whilst the gull flew round shrieking but did not attack (B.S.).

511. COOT.—Winter flocks of Coots were smaller than in some perhaps more severe years. There was a large influx at Malham in autumn—August 19th, 35; September 14th, *c.* 100; September 20th, *c.* 150; November 18th, *c.* 180 (P.F.H.).

513. BLACK GROUSE.—A few birds were seen about the Masham Moors; in upper Swaledale, Wensleydale and Ribblesdale, about Stocks-in-Bowland; and especially about upper Baldersdale where J. R. Scott saw nine Blackcocks on February 28th and young birds later.

517. PHEASANT.—To us who live in pheasant country it seems strange that G.R.E. should flush *his* first bird for the Halifax parish on January 6th, 1949—a hen bird.

520. QUAIL.—Pickering Marishes (R.M.G.); Eston Moor (P. J. Stead); Ilton Moor (P.Y.) were haunts of the species for periods in June, and a field near Walkington in July (R.W.M.). A bird was shot near Thirsk in late September (B. Foggit per N.M.H.). A gamekeeper reported two pairs breeding near North Dalton in a dale where W. A. Butterfield had heard the bird in early summer. A bird was flushed at Weaverthorpe on September 17th (F.J.).

JULY-SEPTEMBER, 1950 No. 834

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The NATURALIST

A QUARTERLY ILLUSTRATED JOURNAL

PRINCIPALLY FOR THE NORTH OF ENGLAND

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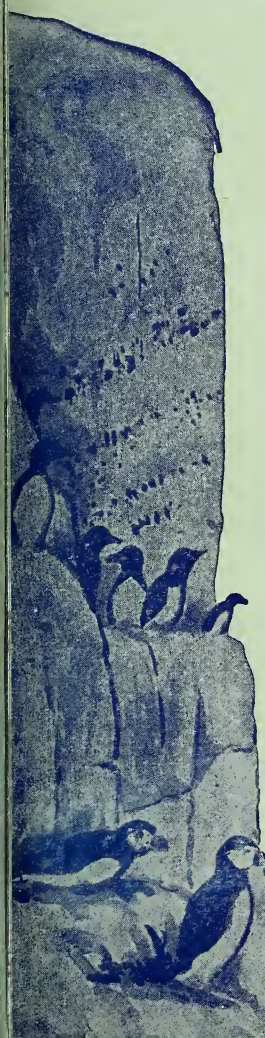

Contents

	PAGE
The Genus Lactarius—*A. A. Pearson, F.L.S.*	81-99
A New Lactarius—*A. A. Pearson, F.L.S.*	100
A New Russula—*A. A. Pearson, F.L.S.*	101-102
Winter Food of Robin—*E. Stubbs.*	102
On the Enemies of Myriapods—*Paul A. Remy*	103-108
Ornithological Report for Northumberland and Durham for 1949	109-125
Field Notes and Records	126-127
Y.N.U. Bryologists at Pateley Bridge—*H. Walsh*	127-128
Book Reviews	129-132
Illustrations	100, 101, 126
Plate III.	

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YORKSHIRE NATURALISTS' UNION

PHENOLOGICAL COMMITTEE

Will Recorders please note that the Phenological Return for the current year should be posted to the Chief Recorder, W. E. L. Wattam, 302 Newsome Road, Huddersfield not later than the 1st October next.

Copies of Dr. J. H. Fidler's 'Coleoptera of Askham Bog' (price 1/-) may be obtained, post free, from The Editor of *The Naturalist.*

NOTICE.

Exchange copies of the following periodicals may be had on loan from The Editor of *The Naturalist*, The University, Leeds 2, on receipt of stamped addressed envelope:

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Irish Naturalists' Journal.
Transactions of the Lincolnshire Naturalists' Union.
Transactions of the British Mycological Society.

YORKSHIRE NATURALISTS' UNION

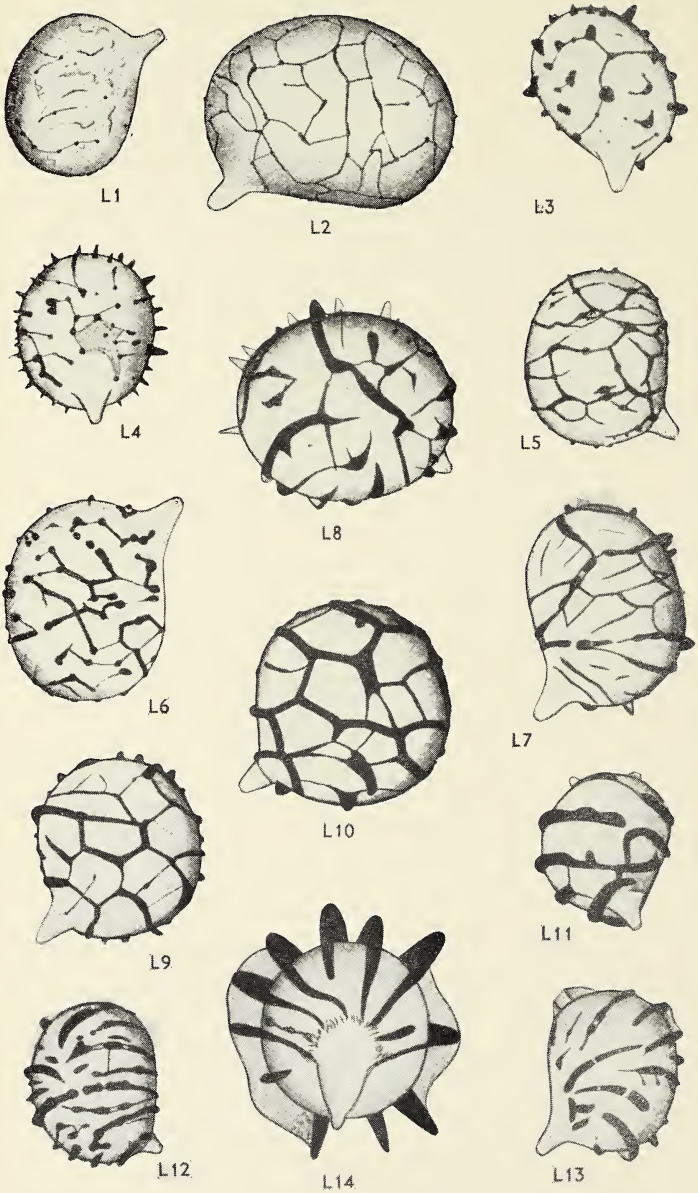
SPURN BIRD OBSERVATORY
WARREN COTTAGE LETTINGS FOR 1950

The Committee desire to have the spring (March to late May) and the autumnal (end of July to mid-November) migration periods covered completely by competent ringers. Preference will be given to Y.N.U. members as far as possible. Charges continue at the rate of 3/- per night per person. Will those willing and able to take charge for periods please agree them with the Hon. Secretary as early as convenient, giving, if possible, alternative dates and periods? This will enable those who can give time out of the holiday seasons to make their plans and to fill blanks. Visits by those who are not registered ringers, short period and week-end occupation, etc., can then be arranged for other helpers who should also apply early. Visits are often difficult to arrange at short notice. With six occupants the cottage is considered full.

G. H. Ainsworth (144 Gillshill Road, Hull),
Hon. Secretary.

LACTARIUS

Types of Spore Ornamentation



M. Josserand, del.

THE GENUS LACTARIUS

A. A. PEARSON, F.L.S.

UNTIL quite recent years the genus *Lactarius* was rather neglected. The species had been clearly described by the classical authors and there did not seem to be many problems to exercise the minds of the systematists. Fries had apparently done his work so well that little more was left except to tie up a few odd loose ends. This process, however, proves to be far from simple.

Ricken in *Die Blätterpilze* (1910-1915) dealt with the genus on old-fashioned lines. The same may be said of Rea in his *British Basidiomycetae* (1922) and of Bresadola in the *Lactarius* section of *Iconographia Mycologica* (1928). More modern methods influenced subsequent authors. Konrad and Favre published descriptions of many *Lactarius* species in 1935 (*Bull. Soc. Myc. Fr.*, 51) and these were incorporated in the work that has been so helpful to mycologists, *Icones Selectae Fungorum* (1924-37) by Konrad and Maublanc. The last volume of the *Flora Agaricina Danica* by J. Lange (1940) gives a more modern picture of the Danish species since he added figures of spores made by F. H. Möller as seen under a magnification of 1,000.

A monograph on very elaborate lines was begun shortly before the second world war in Germany by Knauth and Neuhoff in the series *Die Pilze Mitteleuropas*. The first instalment appeared in 1937 and others continued till 1943 by which time 21 species had been described and 15 illustrated with coloured plates.

In France we have had several notable papers. Romagnesi dealt with the *subdulcis* and *fuliginosi* groups. Josserand gave us a masterly study of *Lactarius* spores. Locquin also has contributed a note on spore structure.

In the present work an effort will be made to give a brief up-to-date account of the genus.

An agaric can easily be recognised as belonging to the genus *Lactarius* from the juice or so-called ' milk ' that exudes from the gills when cut or bruised. Even when the milk is watery or when it refuses to exude, as often happens in some species, there is an indefinable something which betrays it. Though closely related to *Russula* the two genera are rarely confused. The colours are different ; there are no bright scarlet or crimson caps which are such a prominent feature of the *Russulae*. The gills with few exceptions are thin, crowded, narrow and subdecurrent. The flesh is granular and brittle owing to the presence of round cells (spherocysts), but these are not found in the trama of the gills, which accounts for their different character. The spores at a first glance appear to be similar, in both genera broadly ovoid or almost spherical. Under the microscope with a low magnification they appear to be covered with short or long warts or spines, but when examined in an iodine solution and highly magnified (×1,500) they are seen to have an elaborate ornamental surface. The pattern is stained blue-black by the iodine and stands out in relief like microscopic cameos scattered on the field of vision. The pattern varies in different species and consists not only of warts and spines, but also of crests and ridges which may encircle the spore like a belt, be arranged in concentric curves or connected into a partial or complete net with thick or thin lines, close or wide mesh. The iodine stains the surface of the projecting detail only leaving the groundwork colourless so that the pattern is clearly defined. This is due to the delicate amyloid membrane or epispore which covers the spore in its early stages. It is presumed that this breaks up as the spore grows to its full size. The surface of the spore was thought to be smooth and the ornamentation entirely due to the rupture of the episporous membrane into a more or less orderly pattern which orientated towards the hilum, a scar sometimes visible just above the apiculus (Malençon in *Bull. Soc. Myc. Fr.*, 47 (1931)). The main lines do tend to follow this concentric direction but Josserand in *Bull. Soc. Myc. Fr.*, 56 (1940) has shewn that the pattern does not merely consist of the broken fragments of the epispore but is, as it were, a moulded structure of the spore itself. This provides a more solid explanation for the fact that the pattern on the whole is fairly consistent for each species. Though the variation is sometimes considerable, it may be stated in rather broad terms that the general pattern is a reliable specific feature.

With some exceptions the ornamentation of *Lactarius* spores is on bolder lines than those of *Russula*. Spores with isolated warts are rare. Crested curves are more frequent ; they are often deeper, longer and thicker and so is the reticulation. This is shewn on the attached plate where the spores illustrated have been taken from

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the paper by Marcel Josserand referred to above. With his very kind permission they are arranged into types which can be referred to by a number; not perhaps an entirely satisfactory scheme since the more one becomes familiar with the spores of *Lactarius*, the more characteristic and different they are found to be for each species. One spore was not included in Josserand's paper : No. 14, belonging to *Lactarius pterosporus*, described by Romagnesi in the *Revue de Mycologie*, XIV, pp. 108-110 (1949). There is a good deal of variation in the peculiar spores of this species, but most of them have the exceptionally deep lamellate encircling ornamentation not seen in such a marked degree in the spores of any other species.

Spore Powder.—The colour range of *Lactarius* spores in mass does not entirely correspond with the series of colours in Crawshay's chart for *Russula* spores which Mr. Richard Crawshay kindly allowed me to reproduce in the previous paper of this series. The dominant colour for spores freshly shed is a pinkish buff. The pinkish tint disappears when the spores are kept and the colour is then a pale buff. Even fresh spores of the same species may, in dry weather, be buff without the volatile pink tinge. In a few species the spores are almost pure white, changing very slightly with age. There are other tints but no species, in my experience, sheds spores with bright yellow colours. It may, I think, be stated that the spores freshly shed of *Lactarius* species are less constant in colour than those of *Russula*. Spore deposits should be taken on white paper, the powder scraped into a heap and pressed down to observe the colour. For many years I have kept a collection of spores in small packets on which the colour, when fresh, was compared with Ridgway's Colour Chart and duly noted on the packet. The old spore powders are less variable and as suggested by Romagnesi, may be of more diagnostic value than the new, but the general range is small. In the column for details of spores I shew both new and old, using the Crawshay colour terms when appropriate. The age of these spores varies from 17 years to recent collections, but that seems to make little difference. I wish there were fewer gaps in the list.

Cystidia.—These are present in most species on the gill edge and face. They colour blue-black either completely or in part in sulpho-vanillin ; sometimes not at all. In a few species they are either absent or very scarce. As they are rarely of much importance in distinguishing species they are left out.

Milk.—In some species the ' milk ' changes in colour when exposed to the air. This change may take place at once or after a few minutes ; sometimes even longer. The expected change may not occur when drops are placed on a glass slide or the blade of a knife, but will be seen on the gills or on one's finger which perhaps is the best way to make the test.

Taste and Smell.—Both should be carefully noted. The acrid or peppery taste of the milk or the flesh is sometimes delayed. Smells are usually well defined though there are more subtle odours that most of us fail to detect. In some cases the smell varies in fresh and dry specimens. *Lactarius camphoratus* and *L. helvus* have little or no smell at first, but when dried they both emit a pungent aromatic smell of fenugreek which some prefer to call by the less attractive term ' piggy '. *L. serifluus* has the same odour when dried, but starts with a strong smell of the domestic bug (*Cimex lectularius*), less familiar to us than to our grandparents. This unpleasant smell appears in several species. There are other smells : the scent of dried coconut, the smell of pelargonium, better known as the geranium of our parks and suburban gardens, and others which are best left to the expert in smells.

Chemical Reactions.—Colour reactions when chemicals are applied are not always the same in different parts of a sporophore. A great variety of chemicals are being tried and in a few critical cases they are useful. We cannot be expected to have all these chemicals available, but most of us have green vitriol ($FeSO_4$), potassium hydrate (KOH) and ammonia ready to hand and reactions from these are given for some species.

Edibility.—Very few species have found favour with the mycophagist. The best is *Lactarius sanguifluus* which is not found in northern countries. The next is *L. deliciosus* which owes its name to Linneus, who is said to have confused it with *sanguifluus*. It is, however, a very popular edible in the south of Europe and especially in Spain, where I have seen it exposed for sale to the exclusion of all other mushrooms except the even more popular but less common *sanguifluus*. I also remember seeing an old Spaniard eating *L. piperatus* with much relish. *L. volemus* has an exotic flavour much appreciated in some countries and *L. cam-*

phoratus is used as a condiment when dried and crushed into a powder, but would hardly appeal to our own less sophisticated tastes. For the rest there is little to be said except that none are poisonous, in spite of what the old books say.

World Distribution.—Species of *Lactarius* are found in abundance in all the temperate countries of the Northern Hemisphere, but in those of the Southern Hemisphere they appear to be rare Cooke, in his *Handbook of Australian Fungi*, has five species and Cleland in a much more recent work dealing with the larger fungi of South Australia, records two species only of *Lactarius*. In the district round Cape Town only two were seen by me during a whole season's collecting, both in large numbers and both of European origin.

Though not common in tropical countries *Lactarii* are to be found by persistent collectors who must describe them *in situ* since they perish very quickly. E. J. H. Corner tells me that he observed about 15 species in Malaya. Roger Heim, in his admirable work *Les Lactario-Russulés* (1937) gives full details of 12 species from Madagascar including one with a ring on the stem. Madame Goossens-Fontana has recently collected 20 or so species in the Belgian Congo, but R. W. G. Dennis during three months' intensive search in Trinidad did not find more than two, one of which appeared to have a small ring at the apex of the stem.

Descriptions.—Unessential details have been omitted. Nearly all *Lactarii* have a convex cap which becomes depressed with age. The margin is rarely pectinate as in *Russula* and in most cases the gills are crowded, narrow, linear, decurrent or subdecurrent. The full range of colour would only be confusing. The key and the tabular descriptions are based on normal specimens. In all except a few critical species the characters visible to the naked eye or with a pocket lens are sufficient to run down the species. For a fuller knowledge the microscope used with oil immersion and high magnification is essential. The necessary technique is simple and is given in the paper on *Russula* in this series.

All the known European species are included. A few have not yet been found in Britain but most of them should be here.

It is hoped that this introduction to the study of the genus *Lactarius* will prove useful. The author is only too conscious of its imperfections. Its value, however, has been much increased by help received from correspondents abroad, to whom he is indebted for their kind replies to letters dealing with critical species. These include Jules Favre, P. Heinemann, Marcel Josserand, Robert Kühner, Seth Lundell, G. Malençon, F. H. Möller, and Albert Pilát. Some puzzling questions of nomenclature have been carefully considered ; the decisions may not be acceptable to everybody. Some ' minor ' species still remain to be elucidated in the group that cluster round the common *Lactarius subdulcis*. All that is required is a little more observation. Just because a species is common, we are apt to pay it little attention.

Explanation of Plate.—The type numbers are used in the spore column of the tabular descriptions. They only give a rough idea of the spore ornamentation for species other than those mentioned.

L1.	Almost smooth, with minute warts and a few thin lines .	(*L. piperatus*)
L2.	Almost smooth, with minute warts and a network of thin lines	(*L. vellereus*)
L3.	Isolated warts with very few connecting lines . . .	(*L. tabidus*)
L4.	Slender spines with some thin connecting lines .	(*L. camphoratus*)
L5.	Small warts with an almost complete network . . .	(*L. lilacinus*)
L6.	Small warts with occasional thick lines or partial net .	(*L. scrobiculatus*)
L7.	Sparse thick ridges mixed with thin lines or partial net	(*L. glutino-pallens*)
L8.	Long spines, a few thick sparse cristate ridges and partial thin net	(*L. uvidus*)
L9.	Complete network of thick and thin lines . . .	(*L. fuliginosus*)
L10.	Complete network of thick lines	(*L. volemus*)
L11.	Sparse very thick encircling ridges or net with wide mesh .	(*L. hysginus*)
L12.	Densely and concentrically arcuate cristate . . .	(*L. pyrogalus*)
L13.	Sparsely and concentrically arcuate cristate . . .	(*L. pallidus*)
L14.	Concentric deep lamellate almost wing-like ornamentation	(*L. pterosporus*)

When two numbers are present in the spore column, the spore has more or less the character of both types.

Grouping.—The species have been grouped in the following order :

I. GLUTINOSI : Cap viscid when young.

A. Barbati : Margin of cap more or less shaggy.

B. GLABRATI : Margin of cap more or less smooth.
(1) *Colorenti* : Milk turning a fairly bright colour.
(2) *Subcolorenti* : Milk turning a greyish or dull-greenish colour.
(3) *Immutabiles* : Milk unchangeable.

II. SICCI : Cap not viscid when young.
(4) *Olentes* : Smell strong when fresh or when dried.
(5) *Constantes* : Without strong smell ; milk and flesh unchangeable.
(6) *Albati* : Large white species (nearly related to Russula).
(7) *Rubescenti* : Milk and flesh turning reddish.
(8) *Lutescenti* : Milk turning yellow.
(9) *Volemi* : Fleshy species with unchangeable milk, but flesh and gills stain brown.
(10) *Humiles* : Milk unchangeable ; mostly small or very small species.

Key to Species

Milk coloured or changing colour 1
Milk white or watery, unchangeable 11

1. Milk carrot-colour from start . . . . . *L. deliciosus* (9)
Milk dingy wine-red from start . . . . *L. sanguifluus* (10)
Milk white or cloudy, turns reddish 2
Milk white or cloudy, turns violet 4
Milk white or cloudy, turns yellow 6
Milk white or cloudy, turns dingy grey or greenish-grey . . . 10
Milk white or cloudy, turns greenish-blue 30

2. Milk quickly turns red ; cap viscid at first . . . *L. acris* (44)
Milk slowly turns red ; cap dry 3

3. Cap deeply grooved and wrinkled, very dark . *L. lignyotus* (42)
Cap smooth ; pale tan or milky coffee . . *L. fuliginosus* (40)
Cap smooth ; sepia almost black . . . . *L. picinus* (41)
Cap smooth ; umber brown, spores deeply lamellate *L. pterosporus* (43)

4. Large size (10-16 cm.), margin shaggy ; rare . *L. repraesentaneus* (3)
Medium size (3-10 cm.) 5

5. Cap violaceous grey with darker stains ; not zoned . *L. uvidus* (11)
Cap violaceous grey with darker stains ; zoned . var. *violascens* (11a)
Cap yellow with violet stains . . . . . *L. aspideus* (12)

6. Large size (10-20 cm.) 7
Smaller 8

7. Margin shaggy ; cap straw yellow ; under conifers *L. scrobiculatus* (1)
Margin shaggy ; cap white, when rubbed yellow ; leafy woods on chalk soil . . . . . *L. resimus* (2)
Margin not shaggy ; cap slate grey, milk dries to greenish-yellow *L. trivialis* (17)

8. Cap yellow with well marked zones ; milk copious in drops on gills, turns sulphur . . . . . *L. chrysorrheus* (45)
Cap another colour, change in milk not so clear 9

9. Margin striate . . . . . *L. tabidus* (48)
Margin opaque : cap liver-brown ; under pines . *L. hepaticus* (46)
Margin opaque : cap brick or orange buff ; under leafy trees *L. decipiens* (47)
cap brick ; on swampy ground . var. *lacunarum* (47a)
Margin opaque : cap livid greyish-brown, glutinous *L. glutino-pallens* (16)

10. Cap lilaceous grey ; inodorous ; milk dries to grey . *L. vietus* (13)
Cap grey to olive, typically marked with dark concentric spots ; milk turns dingy grey-green . . . . *L. blennius* (14)
Cap umber or olive-brown ; milk turns grey ; very rare *L. umbrinus* (15)
(See also *trivialis* and *glutino-pallens*).

11. Smell strong (at least when dried) 12
Smell faint or none 15

12. Sweet smell of dried coconut : cap greyish lilac . *L. glyciosmus* (30)
Sweet smell of dried coconut : cap dark or greyish-brown *L. confusus* (31)

Smell when fresh of pelargonium . . . *L. decipiens* (47)
Smell strong and pleasant ; cap margin shaggy with brown hairs *L. Mairei* (5)
Smell faint or none when fresh, strong of fenugreek when dry. . . 13
Smell oily or unpleasant of ' bugs ' when fresh 14
13. Fairly large size (5-20 cm.) ; cap cinnamon min. scaly *L. helvus* (26)
Small size (2-5 cm.) ; dark reddish-brown . . *L. camphoratus* (27)
14. Milk white ; cap dark cinnamon ; zoned . . . *L. quietus* (29)
Milk white ; cap ochraceous cinn., apex of stem red *L. rubro-cinctus* (33)
Milk like whey ; cap dark brown ; smell when dried of fenugreek *L. serifluus* (28)
15. Cap pinkish ; margin shaggy . . . . . *L. torminosus* (4)
Cap orange buff ; margin shaggy with brown hairs . *L. Mairei* (5)
Cap margin pubescent 16
Not so 17
16. Large size (6-30 cm.), dark blackish olive or dingy ochre ; under birch . . . . . *L. plumbeus* (6)
Large size, whitish or mottled often with blood-red stains ; under poplars . . . . . *L. controversus* (7)
Small (4-5 cm.) ; cap whitish ; rare . . . . *L. pubescens* (8)
17. All parts white 18
Cap yellowish, ochraceous or rusty buff 19
Cap orange 20
Cap grey or lilaceous grey 21
Cap creamy, pallid clay or chamois 25
Cap brown 26
Cap pinkish lilac or reddish brick 29
18. Robust species with smooth or velvety cap :
Gills densely crowded . . . . . *L. piperatus* (39)
Gills not crowded . . . . . *L. vellereus* (38)
Small size : gills densely crowded ; milk and flesh turn blue *L. glaucescens* (39a)
19. Robust species :
Cap ochraceous straw or buff with darker zones :
Basidia 2 spored, spores large . . *L. insulsus* (20)
Basidia 4 spored, spores small . . *L. zonarius* (19)
Smaller and more slender :
Cap orange yellow with numerous red zones *L. porninsis* (21)
Cap ochraceous, reddish or orange buff :
Cap very small with dark olive centre, on swampy ground *L. obscuratus* (52)
Cap small or medium, without dark olive centre *L. subdulcis* (51)
20. Large fleshy species : cap and stem golden orange *L. volemus* (49)
More slender : cap bright orange, milk unchangeable *L. mitissimus* (50)
More slender : cap reddish buff, milk turns yellow on finger and stains gills . . . . . *L. decipiens* (47)
21. Cap with liquid gluten, livid greyish-brown *L. glutino-pallens* (16)
Cap glutinous, slate grey or lead colour . . *L. trivialis* (17)
(Less glutinous and larger than above.)
Not so 22
22. Gills rich wax-ochre ; cap livid brownish-grey . *L. pyrogalus* (22)
Gills another colour 23
23. Cap lilaceous grey ; milk drops turn grey . . . *L. vietus* (13)
Cap greenish-grey or dark olive, often with darker concentric spots, milk drops turn greenish-grey . . . . *L. blennius* (14)
Not as above 24
24. Cap lead grey, without zones ; under conifers . *L. flexuosus* (37)
with pinkish zones . . var. *roseo-zonatus* (37a)
Cap vinaceous buff, more lead colour when dry, stem obconic ; under hornbeam . . . . . *L. circellatus* (23)
Cap brownish, covered with felty grey down, large size, acutely umbonate ; very rare . . . . . *L. mammosus* (32)

(*Continued on page* 96)

Species	Cap	Gills	Stem
I. GLUTINOSI Quél.			
A. **Barbati** Quél.			
1. *scrobiculatus* (Scop.) Fr.	10-20 cm. glutinous, downy, straw yellow, with or without zones; margin incurved shaggy with brownish hairs.	whitish or flesh tinted	6-15 cm. long, u short, 4-5 cm. t pale yellow pitte darker spots; eq obconic.
2. *resimus* Fr.	10-15 cm., v. viscid, smooth pallid ochraceous, turns yellow with age, incurved margin paler and tomentose, zoneless	whitish or buff	6-15 cm. long, 4- thick, pale ochra pubescent, equal
3. *repraesentaneus* Britz.	10-16 cm. viscid, sometimes with small umbo, bright straw then dull violet when rubbed, smooth centre with adpressed scales elsewhere, margin shaggy	pale cream, stain violet	7-10 × 2½ cm. straw or golden y pitted, viscid or ing when moist
4. *torminosus* (Schaeff.) Fr.	4-12 cm. viscid when moist, pale flesh pink or crushed strawberry sometimes with ochraceous tint, zoned or zoneless, margin shaggy	pinkish white	6-9 × 1½-2½ cm pale flesh pink som pitted, min. tom then smooth
5. *Mairei Malençon*	5-6 cm. viscid at first, centre dark orange-buff, smooth, elsewhere orange-buff with several darker zones and adpressed or slightly recurved scales; margin shaggy with brown hairs	pale orange-buff	4-6 × 1-1½ cm. orange-buff, pale at smooth or ru equal, firm, solid
6. *plumbeus* Fr.	6-30 cm. viscid, dingy olivaceous umber or almost black; tomentose; margin felty-tomentose olive-yellow or brown	very crowded, whitish straw colour, brown when broken or bruised	4-8 × 1-2½ cm. pale or dark olive- apex pale ochre, viscid and pitted
7. *controversus* (Pers.) Fr.	6-30 cm. viscid when moist, whitish, mottled with pink or blood red, often zoned near felty margin	very crowded, pale flesh colour	2-6 × 2-4 cm. whitish or mottle sometimes eccent
8. *pubescens* Fr.	4-5 cm. dry, zoneless, white then pinkish; margin felty	pale flesh pink	2-3 × 1½ cm. pink then white, c
B. **Glabrati** Bataille			
(1) **Colorenti**			
9. *deliciosus* (L.) Fr.	5-15 cm. sub-viscid, orange-saffron, paler and greenish when old, zoned	orange or saffron-yellow then greenish	2-8 × 2-2½ cm. colour of cap, often equal or obconic
10. *sanguifluus* (Paul.) Fr.	5-10 cm. sub-viscid, pinkish orange to pale red with green stains; only vaguely zoned	orange-pink, spotted green	3-6 cm. × 1-2 cm vinaceous pink the dish orange, green; equal conic.

Flesh	Milk	Spores	Chemical Reaction	Habitat
ish, turns yellow-h, very acrid	white, soon turns sulphur yellow, copious, very acrid	Fresh : D. Old : D-E. 8-9×6½-7μ L6	Flesh+Fe=O.	chiefly under conifers; uncommon
buff or white, turns lphur yellow in tline, slightly acrid	white, soon turns sulphur yellow, slightly acrid	Fresh : D Old : D-E 8-8½×6½-7μ L6		under deciduous trees on calcareous soil, uncommon
cream, turns violet aste like wild yme, sec Favre)	white, then violet on gills but not when isolated on glass; taste mild, then bitter	9-11×7¾-9μ L7		spruce woods; rare
ish with pinkish tline	white, unchangeable, very acrid	Fresh : pale pinkish buff Old : D 9-10×6-7μ L5	Cap and flesh +KOH=orange-yellow	under birch, common
pale buff, very rid, smell strong, easant	white, unchangeable, copious, very acrid	Fresh : D Old : D 7-7½×6-7μ L9		among alien trees; rare
e	copious, white, unchangeable or turns slightly grey, very acrid	Fresh : pale pinkish buff Old : D 7½-8×6-6½μ L7	Cap and stem +KOH=black +Fe=ochre Flesh+KOH=O Flesh+Ammonia =violet	under birch; common
e	white, unchangeable, acrid	Fresh : D Old : D 7-8×5-5½μ L9		mostly under poplar; fairly common
e with pink outline	white, rather sparse, unchangeable, acrid			rare
e, then reddish, ually green	saffron or carrot colour, copious, mild then slightly acrid	Fresh : pale pinkish buff Old : E 9-10×6-7μ L6—L3—L9 very variable	urine is red after eating *deliciosus*; not so with *L. sanguifluus*	under conifers; common
e, then blood-red, pecially on outline	blood red or wine red, rather scanty, slightly acrid	Fresh : light buff Old : E 8-10×6-7μ L5		under pines; British record probably an error; grows in warmer countries

Species	Cap	Gills	Stem	Flesh	Milk	Spores	Chemical Reaction	Habitat
I. GLUTINOSI Quél. **A. Barbati** Quél.								
1. *scrobiculatus* (Scop.) Fr.	10-20 cm. glutinous, downy, straw yellow, with or without zones; margin incurved shaggy with brownish hairs.	whitish or flesb tinted	6-15 cm. long, us short, 4-5 cm. thi pale yellow pitted w darker spots; equ obconic.	whitish, turns yellow- sh, very acrid	white, soon turns sulphur yellow, copious, very acrid	Fresh: D. Old: D-E. 8-9×6½-7μ L6	Fleshe+Fe=O.	chiefly under conifers; uncommon
2. *resimus* Fr.	10-15 cm., v. viscid, smooth pallid ochraceous, turns yellow with age, incurved margin paler and tomentose, zoncless	whitish or buff	6-15 cm. long, 4-5 thick, pale ochraceo pubescent, equal	ale buff or white, turns sulphur yellow in outline, slightly acrid	white, soon turns sulphur yellow, slightly acrid	Fresh: D Old: D-E 8-8½×6½-7μ L6		under deciduous trees on calcareous soil, uncommon
3. *reproesentoneus* Britz.	10-16 cm. viscid, sometimes with small umbo, bright straw then dull violet when rubbed, smootb centre with adpressed scales elsewhere, margin shaggy	pale cream, stain violet	7-10×2½ cm. straw or golden yel pitted, viscid or wa ing wben moist	ale cream, turns violet (taste like wild thyme, see Favre)	white, then violet on gills but not when isolated on glass; taste mild, then bitter	9-11×7½-9μ L7		spruce woods; rare
4. *torminosus* (Schaeff.) Fr.	4-12 cm. viscid when moist, pale flesb pink or crushed strawberry sometimes with ochraceous tint, zoned or zoneless, margin shaggy	pinkish white	6-9×1½-2½ cm. pale flesh pink someti pitted, min. tomen then smooth	hitish with pinkish outline	white, unchangeable, very acrid	Fresh: pale pinkish buff Old: D 9-10×6-7μ L5	Cap and flesh +KOH=orange-yellow	under birch, common
5. *Moirei Molençon*	5-6 cm. viscid at first, centre dark orange-buff, smooth, elsewbere orange-buff with several darker zones and adpressed or slightly recurved scales; margin sbaggy witb brown bairs	pale orange-buff	4-6×1-1½ cm. orange-buff, pale at a smooth or rugul equal, firm, solid	ery pale buff, very ard, smell strong, pleasant	white, unchangeable, copious, very acrid	Fresh: D Old: D 7-7½×6-7μ L9		among alien trees; rare
6. *plumbeus* Fr.	6-30 cm. viscid, dingy olivaceous umber or almost black; tomentose; margin felty-tomentose olive-yellow or brown	very crowded, whitish straw colour, brown wben broken or bruised	4-8×1-2½ cm. pale or dark olive-bro apex pale ochre, dr viscid and pitted	hite	copious, white, unchangeable or turns slightly grey, very acrid	Fresh: pale pinkish buff Old: D 7½-8×6-6½μ L7	Cap and stem +KOH=black +Fe=ochre Flesh+KOH=O Flesh+Ammonia =violet	under birch; common
7. *controversus* (Pers.) Fr.	6-30 cm. viscid when moist, whitish, mottled with pink or blood red, often zoned near felty margin	very crowded, pale flesh colour	2-6×2-4 cm. whitisb or mottled sometimes eccentric	white	white, unchangeable, acrid	Fresh: D Old: D 7-8×5-5½μ L9		mostly under poplar; fairly common
8. *pubescens* Fr.	4-5 cm. dry, zoneless, white then pinkish; margin felty	pale flesh pink	2-3×1½ cm. pink then white, obcon	hite with pink outline	white, rather sparse, unchangeable, acrid			rare
B. Glabrati Bataille **(1) Colorenti**								
9. *deliciosus* (L.) Fr.	5-15 cm. sub-viscid, orange-saffron, paler and greenish when old, zoned	orange or saffron-yellow then greenish	2-8×2-2½ cm. colour of cap, often pitt equal or obconic	ow, then reddish, ually green	saffron or carrot colour, copious, mild then slightly acrid	Fresh: pale pinkish buff Old: E 9-10×6-7μ L6—L3—L9 very variable	urine is red after eating *deliciosus*; not so with *L. sanguifluus*	under conifers; common
10. *sanguifluus* (Paul.) Fr.	5-10 cm. sub-viscid, pinkish orange to pale red with green stains; only vaguely zoned	orange-pink, spotted green	3-6 cm.×1-2 cm. vinaceous pink then r dish orange, fina green; equal or conic.	ite, then blood-red, specially on outline	blood red or wine red, rather scanty, slightly acrid	Fresh: light buff Old: E 8-10×6-7μ L5		under pines; British record probably an error; grows in warmer countries

Species	Cap	Gills	Stem
11. *uvidus* Fr.	3-10 cm. viscid, violaceous grey sometimes with darker stains, not zoned; margin pruinose-pubescent	white, cream or flesh colour, lilac when rubbed	4-7×1-2 cm. sub-viscid, whitis light yellow sp lilac and later rusty stains
11a. ,, var. *violascens* (Otto ex Fr.) Quél.	differs from type in having well-defined concentric zones		
12. *aspideus* Fr.	5-10 cm. viscid, sometimes with small umbo; pale sulphur or straw yellow, stains violet; more or less zoned	creamy white then cream, violet when bruised	3-8×1-1½ cm. colour of cap or above, equal o minate
(See also *acris*, No. 44)			
(2) **Subcolorenti**			
13. *vietus* Fr.	3-6 cm. slightly viscid when moist, sometimes papillate, silky when dry, lilaceous flesh colour; covered with a fugacious down, especially at margin	whitish then yellowish flesh colour, staining olive-brown when bruised	5-7×1-1½ cm. paler than cap, ur apex pruinose
14. *blennius* Fr.	4-10 cm. viscid, varies from apple or dark olive-brown to greenish-grey, often with concentric darker spots; margin slightly downy at first	white, smoky- or olive-brown when bruised	4-5×1-2 cm. pale olive or grey, equal or acumina
15. *umbrinus* (Pers.) Fr.	5-7½ cm. umber brown, when old paler with yellow tint, zoneless, flocculose, cracking	white then dingy buff	2½-3½×1-2 cm. like cap or pale gr
16. *glutino-pallens* Lange	3-8 cm. remarkably glutinous, livid greyish-brown, paler when old, mottled when lightly rubbed (blackish grains between the hyphae)	creamy white, then dingy cream	4-7×1-1½ cm. white with flush o ish-brown, viscic ished, unequal,
17. *trivialis* Fr.	6-17 cm. glutinous, shining when dry; violaceous slate-grey or lead colour with dingy flesh tint when old; vaguely zoned or with darker patches; margin pubescent when young, smooth later (no blackish grains between hyphae)	pale straw then pinkish-buff with rusty stains when old; small gills numerous	7-8×2-4 cm. greasy; pinkish above, straw below, sometimes with darker spots lose, unequal, ho
18. *musteus* Fr.	4-10 cm. viscid, pale chamois, zoneless, margin minutely pubescent when young; cuticle peels	white then pale chamois, ochre to touch or with age	5-8×1-3 cm. paler than cap o darker spots, s hollow
(3) **Immutabiles**			
19. *zonarius* (Bull.) Fr.	5-15 cm. slightly viscid, straw yellow with saffron-orange zones; margin pubescent then naked	whitish then flesh-yellow, unequal	3-8×1-4 cm. usually short, pale sometimes pitte darker hollows

Flesh	Milk	Spores	Chemical Reactions	Habitat
e, turns lilac ; in-orous, slightly ter	white, then violet, bitter or slightly acrid	Fresh : E Old : E 10-11×8-9μ L8 Old : D-E	Flesh+Gaiac= bright-blue	on wet ground under birch ; fairly common
e, quickly turns iolet, smell faint	white, quickly violet, copious	Fresh : pale pinkish buff Old : D-E 10-11×8-8½μ deeply cristate and netted between L7—L13	Flesh+Gaiac= slowly olive brown	leafy woods ; rather common
ish or grey, in-orous	white, dries grey on gills, copious, slowly acrid	Fresh : pale pinkish buff Old : D 8¾-9×6½-6¾μ L8	Cap+KOH =ochraceous Cap+Fe=O	damp woods, birch or pine ; common
e, then grey or enish grey, in-orous, acrid	white, dries greenish grey on gills, copious, acrid	Fresh : pale pinkish buff Old : D 7½-8×6½-6¾μ L13—L7	Flesh+KOH =ochraceous	chiefly under beech, common
e, then brown, id	white, stains gills grey or blackish, very acrid	8×7μ L9 from *exsiccata* Sydow (1888)		in coniferous woods ; little known species ; no recent British record
sh, smell faint but pleasant, acrid	white, fairly copious, forms yellowish hard drops on gill ; acrid	9-10×7μ L12—L7	Flesh+KOH= brownish-orange	under spruce and fir on wet mossy ground (not yet recorded for Britain)
sh, smell faint	white, forming drops which turn very slightly greenish-yellow, slowly acrid	8-10×6-7μ L7	Flesh+KOH=O	on wet mossy ground ; uncommon
sh, then chamois	white, sparse, unchangeable when isolated but stains gills ochre	9-10×7-8½μ cristate reticulate (J.F.)		in damp pine woods among *Sphagnum* rare ; no British record
te	white, very acrid, copious	Fresh : pinkish buff Old : E Basidia 4 spored subglobose to ovoid 8-8½×6½-7μ deeply cristate netted L9 but ridges deeper		mixed woods ; uncommon (see note on *insulsus*)

Species	Cap	Gills	Stem	Flesh	Milk	Spores	Chemical Reactions	Habitat
11. *uvidus* Fr.	3-10 cm. viscid, violaceous grey sometimes with darker stains, not zoned; margin pruinose-pubescent	white, cream or flesh colour, lilac when rubbed	4-7×1-2 cm. sub-viscid, whitish light yellow spots lilac and later rusty stains	white, turns lilac; inodorous, slightly bitter	white, then violet, bitter or slightly acrid	Fresh: E Old: E 10-11×8-9μ L8	Flesh+Gaiac=bright-blue	on wet ground under birch; fairly common
11a. ,, var. ***violascens*** (Otto ex Fr.) Quél.	differs from type in having well-defined concentric zones					Old: D-E		
12. *aspideus* Fr.	5-10 cm. viscid, sometimes with small umbo; pale sulphur or straw yellow, stains violet; more or less zoned	creamy white then cream, violet when bruised	3-8×1-1½ cm. colour of cap or ab above, equal or a minate	white, quickly turns violet, smell faint	white, quickly violet, copious	Fresh: pale pinkish buff Old: D-E 10-11×8-8½μ deeply cristate and netted between L7—L13	Flesh+Gaiac=slowly olive brown	leafy woods; rather common
(See also *acris*, No. 44)								
(2) **Subcolorenti**								
13. *vietus* Fr.	3-6 cm. slightly viscid when moist, sometimes papillate, silky when dry, lilaceous flesh colour; covered with a fugacious down, especially at margin	whitish then yellowish flesh colour, staining olive-brown when bruised	5-7×1-1½ cm. paler than cap, unta apex pruinose	whitish or grey, inodorous	white, dries grey on gills, copious, slowly aerid	Fresh: pale pinkish buff Old: D 8½-9×6½-6¾μ L8	Cap+KOH=ochraceous Cap+Fe=O	damp woods, birch or pine; common
14. *blennius* Fr.	4-10 cm. viscid, varies from apple or dark olive-brown to greenish-grey, often with concentric darker spots; margin slightly downy at first	white, smoky- or olive-brown when bruised	4-5×1-2 cm. pale olive or grey, va equal or acuminat	white, then grey or greenish grey, inodorous, acrid	white, dries greenish grey on gills, copious, aerid	Fresh: pale pinkish buff Old: D 7½-8×6½-6¾μ L13—L7	Flesh+KOH=ochraceous	chiefly under beech, common
15. *umbrinus* (Pers.) Fr.	5-7½ cm. umber brown, when old paler with yellow tint, zoneless, flocculose, cracking	white- then dingy buff	2½-3½×1-2 cm. like cap or pale grey	white, then brown, acrid	white, stains gills grey or blackish, very acrid	8×7μ L9 from *exsiccata* Sydow (1888)		in coniferous woods; little known species; no recent British record
16. *glutino-pallens* Lange	3-8 cm. remarkably glutinous, livid greyish-brown, paler when old, mottled when lightly rubbed (blackish grains between the hyphae)	creamy white, then dingy cream	4-7×1-1½ cm. white with flush of ish-brown, viscid, ished, unequal, ho	whitish, smell faint but unpleasant, acrid	white, fairly copious, forms yellowish hard drops on gill; acrid	9-10×7μ L12—L7	Flesh+KOH=brownish-orange	under spruce and fir on wet mossy ground (not yet recorded for Britain)
17. *trivialis* Fr.	6-17 cm. glutinous, shining when dry; violaceous slate-grey or lead colour with dingy flesh tint when old; vaguely zoned or with darker patches; margin pubescent when young, smooth later (no blackish grains between hyphae)	pale straw then pinkish-buff with rusty stains when old; small gills numerous	7-8×2-4 cm. greasy; pinkish-b above, straw-ye below, sometimes s with darker spots, es lose, unequal, hol	whitish, smell faint	white, forming drops which turn very slightly greenish-yellow, slowly acrid	8-10×6-7μ L7	Flesh+KOH=O	on wet mossy ground; uncommon
18. *musteus* Fr.	4-10 cm. viscid, pale chamois, zoneless, margin minutely pubescent when young; cuticle peels	white then pale chamois, ochre to touch or with age	5-8×1-3 cm. paler than cap or darker spots, spong hollow	whitish, then chamois	white, sparse, unchangeable when isolated but stains gills ochre	9-10×7-8½μ cristate reticulate (J.F.)		in damp pine woods among *Sphagnum* rare; no British record
(3) **Immutabiles**								
19. *zonarius* (Bull.) Fr.	5-15 cm. slightly viscid, straw yellow with saffron-orange zones; margin pubescent then naked	whitish then flesh-yellow, unequal	3-8×1-4 cm. usually short, pale y sometimes pitted darker hollows	white	white, very acrid, copious	Fresh: pinkish buff Old: E Basidia 4 spored subglobose to ovoid 8-8½-6½-7μ deeply cristate netted L9 but ridges deeper		mixed woods; uncommon (see note on *insulsus*)

Species	Cap	Gills	Stem
20. *insulsus* Fr.	5-15 cm. slightly viscid, pale tan or buff with darker zones	white to flesh colour	2-8 × 1-2½ cm. usually short, whit pale buff, often p
21. *porninsis* Rolland	5-8 cm. viscid, orange-yellow with numerous red zones (rarely spotted or zoneless); margin at first slightly pubescent	orange yellow, paler than cap	2-5 cm. × 7-12 mm. ochraceous then buf rather corticate
22. *pyrogalus* (Bull.) Fr.	5-10 cm. slightly viscid, greyish tan to olive buff or dingy yellow; vaguely zoned	pale wax yellow then a rich dark ochre	4-6 × 1-1½ cm. pale buff or dirty iv cylindrical or att ated at base, delica tomentose
23. *circellatus* Fr.	4-10 cm. slightly viscid, vinaceous buff with vague or well-marked darker zones drying to a lead-like polish; surface rather rough and irregular	orange-buff	3-4 × 1-1½ cm. central or eccentric, o obconic and sh whitish or violace grey
24. *hysginus* Fr.	5-6 cm. glutinous, shining when dry, dark reddish-brown or dingy purplish-flesh colour, zoneless or vaguely zoned	pale yellow	3-4 × 1-1½ cm. yellowish with flush reddish brown or spotted, viscid
25. *pallidus* (Scop.) Fr.	6-15 cm. viscid, cream to pale clay, zoneless, smooth	white then creamy flesh colour	3-15 × 2-3 cm. pale creamy or pale cl slippery, firm, ho
II. SICCI			
(4) **Olentes**			
26. *helvus* Fr.	5-20 cm. cinnamon to dingy tan covered with small floccose scales	creamy flesh colour then ochre	5-8 × 1-2 cm. colour of cap or pa base white toment equal or fusoid
27. *camphoratus* (Bull.) Fr.	2-5 cm. usually small, smooth, often with small papillate umbo; reddish brown then paler, often wrinkled	flesh pink	2-4 cm. × 4-6 mm. colour of cap, smoo pruinose above, eq or fusoid
28. *serifluus* (DC.) Fr.	3-6 cm. dark reddish-brown or sepia; margin irregular or plicate; rugulose	yellowish flesh colour then reddish	3-5 cm. × 4-6 mm. colour of cap or pa rugulose, equal or fusoid
29. *quietus* Fr.	3-9 cm. dark cinnamon to milky coffee, often obscurely zoned, somewhat silky	pale cinnamon	4-9 × 1-1½ cm. darker and redder t cap, rugose, spon equal.

Flesh	Milk	Spores	Chemical Reactions	Habitat
e	white, acrid, copious	Fresh : pinkish-buff Old : E Basidia 2 spored. 13-14×11-12μ echinulate, with connecting lines like L6		mixed woods; uncommon (see note)
sh pale buff, more nge in outline ; no ell or faint and unasant ; bitter or htly acrid	white, mild then bitter or acrid	7-10×6-7½μ (K. & M.)		under larch ; no record for Britain yet
with greyish oute	white, very acrid ; sometimes hardens into yellowish drops on gills	Fresh : pinkish buff Old : E 7-8×6μ L12	Cap+KOH=ochre	chiefly under hazel, common
	white, rather scanty, slowly acrid	Fresh : pinkish buff Old : E 7-8×6μ L12		under hornbeam ; uncommon
with red tint	white, very acrid, copious	6-7×5½-6μ L11		under conifers ; rare
y flesh colour, ld then slowly id, smell faint asant	white, rather copious ; mild then acrid	Fresh : pinkish buff Old : E 8-9×6½-7μ L13—L7	Flesh+Fe=O	beech woods ; common
e, creamy buff, le cinnamon in conr ; smell faint en fresh, strongly matic of fenugreek en dried	white watery, scanty, mild then slightly acrid	Fresh : C Old : C-D 9-10×5½-6½μ L5	Cap+KOH= slight yellow tint Cap and flesh+Fe =lilac	on wet ground in or near conifers ; uncommon
eddish with deeper line ; mild, inorous when fresh, ong smell of fenuek when dry	watery like whey, scanty, mild	Fresh : D Old : D 6-7×6μ L4 and L9	Cap+KOH= slight olive tinge Flesh+Fe=O	under conifers ; common
sh tawny, darker line ; smell of bugs sh, of fenugreek ed	watery like whey, scanty, mild	Fresh : D Old : D 7¾-8½×7-7½μ L9	Cap+KOH=brown	mixed woods ; common
then reddish ; ld ; smell of bugs en fresh	white, sparse, mild	Fresh : pale pinkish buff Old : C-D 8½-9½×6½-7½μ L6	Cap+KOH=slight olive-brown tint Flesh+Fe=olive tint Cap+Fe=O	oak woods, common

Species	Cap	Gills	Stem	Flesh	Milk	Spores	Chemical Reactions	Habitat
20. *insulsus* Fr.	5-15 cm. slightly viscid, pale tan or buff with darker zones	white to flesh colour	2-8×1-2½ cm. usually short, white pale buff, often pits	white	white, acrid, copious	Fresh : pinkish-buff Old : E Basidia 2 spored. 13-14×11-12μ echinulate, with connecting lines like L6		mixed woods; uncommon (see note)
21. *porninsis* Rolland	5-8 cm. viscid, orange-yellow with numerous red zones (rarely spotted or zoneless); margin at first slightly pubescent	orange yellow, paler than cap	2-5 cm.×7-12 mm. ochraceous then buff, rather corticate	whitish pale buff, more orange in outline; no smell or faint and unpleasant; bitter or slightly acrid	white, mild then bitter or acrid	7-10×6-7½μ (K. & M.)		under larch; no record for Britain yet
22. *pyrogalus* (Bull.) Fr.	5-10 cm. slightly viscid, greyish tan to olive buff or dingy yellow; vaguely zoned	pale wax yellow then a rich dark ochre	4-6×1-1½ cm. pale buff or dirty ivo cylindrical or atte ated at base, delicate tomentose	white with greyish outline	white, very acrid; sometimes hardens into yellowish drops on gills	Fresh : pinkish buff Old : E 7-8×6μ L12	Cap+KOH=ochre	chiefly under hazel, common
23. *circellatus* Fr.	4-10 cm. slightly viscid, vinaceous buff with vague or well-marked darker zones drying to a lead-like polish; surface rather rough and irregular	orange-buff	3-4×1-1½ cm. central or eccentric, obc obconic and sho whitish or violaceo grey	white	white, rather scanty, slowly acrid	Fresh : pinkish buff Old : E 7-8×6μ L12		under hornbeam; uncommon
24. *hysginus* Fr.	5-6 cm. glutinous, shining when dry, dark reddish-brown or dingy purplish-flesh colour, zoneless or vaguely zoned	pale yellow	3-4×1-1½ cm. yellowish with flush reddish brown or spotted, viscid	white with red tint	white, very acrid, copious	6-7×5½-6μ L11		under conifers; rare
25. *pallidus* (Scop.) Fr.	6-15 cm. viscid, cream to pale clay, zoneless, smooth	white then creamy flesh colour	3-15×2-3 cm. pale creamy or pale cla slippery, firm, boll	creamy flesh colour, mild then slowly acrid, smell faint pleasant	white, rather copious; mild then acrid	Fresh : pinkish buff Old : E 8-9×6½-7μ L13—L7	Flesh+Fe=O	beech woods; common
H. SICCI (4) Olentes								
26. *helvus* Fr.	5-20 cm. cinnamon to dingy tan covered with small floccose scales	creamy flesh colour then ochre	5-8×1-2 cm. colour of cap or pale base white tomentose equal or fusoid	fragile, creamy buff, pale cinnamon in contour; smell faint when fresh, strongly aromatic of fenugreek when dried	white watery, scanty, mild then slightly acrid	Fresh : C Old : C-D 9-10×5½-6½μ L5	Cap+KOH= slight yellow tint Cap and flesh+Fe =lilac	on wet ground in or near conifers; uncommon
27. *camphoratus* (Bull.) Fr.	2-5 cm. usually small, smooth, often with small papillate umbo; reddish brown then paler, often wrinkled	flesh pink	2-4 cm.×4-6 mm. colour of cap, smooth pruinose above, equ or fusoid	pale reddish with deeper outline; mild, inodorous when fresh, strong smell of fenugreek when dry	watery like whey, scanty, mild	Fresh : D Old : D 6-7×6μ L4 and L9	Cap+KOH= slight olive tinge Flesh+Fe=O	under conifers; common
28. *serifluus* (DC.) Fr.	3-6 cm. dark reddish-brown or sepia; margin irregular or plicate; rugulose	yellowish flesh colour then reddish	3-5 cm.×4-6 mm. colour of cap or pale rugulose, equal or fusoid	reddish tawny, darker outline; smell of bugs fresh, of fenugreek dried	watery like whey, scanty, mild	Fresh : D Old : D 7½-8½×7-7½μ L9	Cap+KOH=brown	mixed woods; common
29. *quietus* Fr.	3-9 cm. dark cinnamon to milky coffee, often obscurely zoned, somewhat silky	pale cinnamon	4-9×1-1½ cm. darker and redder th cap, rugose, spong equal.	white then reddish; mild; smell of bugs when fresh	white, sparse, mild	Fresh : pale pinkish buff Old : C-D 8½-9½×6½-7½μ L6	Cap+KOH=slight olive-brown tint Flesh+Fe=olive tint Cap+Fe=O	oak woods, common

Species	Cap	Gills	Stem
30. ***glyciosmus*** Fr.	2-7 cm. with central papilla, greyish-lilac or lilaceous brown, innately scaly	pinkish buff to pale ochraceous	3-5 cm. × 5-8 mm. paler than cap, s pubescent, equal
31. ***confusus*** Lundell	2½-9 cm. with central papilla, dark or greyish-brown with violaceous tint; silvery pruinose when young breaking up into adpressed scales	buff to flesh pink then ochraceous	3-10 × ½-2½ cm. whitish with flesh olive-grey tint, dark like cap; e
32. ***mammosus*** Fr.	large size with acute umbo which flattens out later, brownish with felty grey down	whitish then pale rusty	5-8 × 1-1½ cm. white, pubescent, firi
33. ***rubro-cinctus*** Fr. sensu Lange	5-7 cm. ochraceous cinnamon rugulose	buff with flesh tint, turns pale lilac when bruised, then brownish	rather short, apex narrow reddish zone
(5) **Constantes**			
34. ***rufus*** (Scop.) Fr.	5-10 cm. with granular surface usually umbilicate with papillate umbo, bay rufous-brown	creamy or buff, later with reddish tint	5-8 × 1-1½ cm. paler than cap, prui white pubescence base; equal
35. ***spinosulus*** Quél.	1½-6 cm. umbilicate with pointed papilla, flesh pink to brick-reddish, sometimes zoned, tomentose, breaking up into small scales, adpressed in centre, erect and pointed elsewhere	pale buff then flesh pink	2-4 cm. × 2-6 mm paler than cap, equ attenuated below
36. ***lilacinus*** (Lasch.) Fr.	3-8 cm. umbilicate, seldom with small papillate umbo, minutely pubescent, with concentric small scales; dingy lilaceous grey turning rusty tint when old; margin with small vinaceous granules, smooth when old	dingy tan with tinge of flesh pink then dingy ochraceous	3-8 cm. × 5-15 mm ochraceous with flesh unequal
37. ***flexuosus*** Fr.	5-10 cm. lead-grey or violaceous grey with or without darker zones, floccose; margin whitish, velvety	distant, light yellow then flesh colour	5-9 × 1½-2½ cm. pale grey, apex wh base yellowish lacunose or pitte minutely pubescer
37a. ,, var. ***roseozonatus*** Fr.	differs in cap being pale lilac-pink with darker zones		
(6) **Albati**			
38. ***vellereus*** Fr.	10-30 cm. white or with yellowish stains, velvety pubescent, compact	distant, thick, white then pale ochre, forked	5-8 × 2½-6 cm. white turns yellc minutely pubesc stout, usually sho

Flesh	Milk	Spores	Chemical Reactions	Habitat
sh, creamy flesh our in outline; ld then slightly id, smell sweet of onut candy	white, scanty, mild then slightly acrid	Fresh : D Old : D 7-8×6-7μ L7—L13	Flesh+Fe= olive buff Cap+Fe= lilaceous olive	deciduous woods especially birch; common
sh, mild then more ter than acrid, ell of coconut	white, scanty, mild or slightly bitter	Fresh : C-D 7-8×5½-6μ L9	Flesh+Fe= olive buff Cap+Fe= olive brown or snuff brown	coniferous woods; see note
sh white, mild wly acrid; smell first none, when of coconut (see *nagnesi*)	white, mild, slowly acrid			under conifers; very rare; British record doubtful
h with reddish outline, smell rancid	white, mild	7-7½×6μ (Lange) warted and with thin net		chiefly under beech; not uncommon in some years in Denmark; not recorded for Britain
h, reddish in con-	white, rather copious, very peppery	Fresh : very pale pinkish-buff Old : B 9-10×6½-7μ L5	Flesh+Fe= pinkish buff Cap+Fe=dark violaceous brown	coniferous woods; common
n or flesh pink, , smell faint	white, copious when young, sparse later, mild then acrid	Fresh : pinkish buff Old : B 7½-8×6-6½ thickly and concentrically cristate L12	milk+KOH=O	on damp ground in leafy woods, fairly common
pale ochre, whitn outline, mild, l faint, pleasant etimes slightly of greek, see Knauth euhoff)	watery like whey, mild, sometimes forms greenish-grey drops	Fresh : almost white 7½-10×6½-8½μ (K. and N.) with small warts and fine net. L5	Flesh+KOH=O	under alders, often in tufts; most British records refer to *spinosulus*
hard	white, very acrid	7×6μ L9		on grassy edge of pine woods; uncommon
				rare
compact, very	white, scanty, very acrid, sometimes with an evanescent sulphur tint	Fresh: white. Old: B 9-11×7½-8½μ with minute warts and network of thin lines L2	Cap+KOH=pale reddish. Flesh+KOH=O Flesh+Fe= orange-buff Milk+KOH= ochraceous orange	leafy woods; common

Species	Cap	Gills	Stem	Flesh	Milk	Spores	Chemical Reactions	Habitat
30. *glyciosmus* Fr.	2-7 cm. with central papilla, greyish-lilac or lilaceous brown, innately scaly	pinkish buff to pale ochraceous	3-5 cm. × 5-8 mm. paler than cap, sl puhescent, equal	hitish, creamy flesh colour in outline; mild then slightly acrid, smell sweet of coconut candy	white, scanty, mild then slightly acrid	Fresh : D Old : D 7-8 × 6-7 μ L7—L13	Flesh + Fe = olive buff Cap + Fe = lilaceous olive	deciduous woods especially hirch; common
31. *confusus* Lundell	2½-9 cm. with central papilla, dark or greyish-hrown with violaceous tint; silvery pruinose when young hreaking up into adpressed scales	huff to flesh pink then ochraceous	3-10 × ½-2½ cm. whitish with flesh olive-grey tint, b dark like cap; equ	hitish, mild then more bitter than acrid, smell of coconut	white, scanty, mild or slightly hitter	Fresh : C-D 7-8 × 5½-6 μ L9	Flesh + Fe = olive buff Cap + Fe = olive brown or snuff brown	coniferous woods; see note
32. *mommosus* Fr.	large size with acute umbo which flattens out later, brownish with felty grey down	whitish then pale rusty	5-8 × 1-1½ cm. white, pubescent, firm	ddish white, mild slowly acrid; smell at first none, when old of coconut (see *Romagnesi*)	white, mild, slowly acrid			under conifers; very rare; British record doubtful
33. *rubro-cinctus* Fr. sensu Lange	5-7 cm. ochraceous cinnamon rugulose	huff with flesh tint, turns pale lilac when hruised, then brownish	rather short, apex w narrow reddish zone	hitish with reddish buff outline, smell oily rancid	white, mild	7-7½ × 6 μ (Lange) warted and with thin net		chiefly under beech; not uncommon in some years in Denmark; not recorded for Britain
(5) **Constantes**								
34. *rufus* (Scop.) Fr.	5-10 cm. with granular surface usually umbilicate with papillate umbo, hay rufous-hrown	creamy or huff, later with reddish tint	5-8 × 1-1½ cm. paler than cap, pruino white pubescence hase; equal	hitish, reddish in contour	white, rather copious, very peppery	Fresh : very pale pinkish-huff Old : B 9-10 × 6½-7 μ L5	Flesh + Fe = pinkish huff Cap + Fe = dark violaceous hrown	coniferous woods; common
35. *spinosulus* Quél.	1½-6 cm. umbilicate with pointed papilla, flesh pink to hrick-reddish, sometimes zoned, tomentose, hreaking up into small scales, adpressed in centre, erect and pointed elsewhere	pale huff then flesh pink	2-4 cm. × 2-6 mm. palcr than cap, equal attenuated below	hitish or flesh pink, mild, smell faint	white, copious when young, sparse later, mild then acrid	Fresh : pinkish buff Old : B 7½-8 × 6-6½ thickly and concentrically cristate L12	milk + KOH = O	on damp ground in leafy woods, fairly common
36. *lilocinus* (Lasch.) Fr.	3-8 cm. umbilicate, seldom with small papillate umbo, minutely pubescent, with concentric small scales; dingy lilaceous grey turning rusty tint when old; margin with small vinaceous granules, smooth when old	dingy tan with tinge of flesh pink then dingy ochraceous	3-8 cm. × 5-15 mm. ochraceous with flesh u unequal	ggy pale ochre, whitish in outline, mild, smell faint, pleasant (sometimes slightly of Fenugreek, see Knauth & Neuhoff)	watery like whey, mild, sometimes forms greenish-grey drops	Fresh : almost white 7½-10 × 6½-8½ μ (K. and N.) with small warts and fine net. L5	Flesh + KOH = O	under alders, often in tufts; most British records refer to *spinosulus*
37. *flexuosus* Fr.	5-10 cm. lead-grey or violaceous grey with or without darker zones, floccose; margin whitish, velvety	distant, light yellow then flesh colour	5-9 × 1½-2½ cm. pale grey, apex whitis hase yellowish ch lacunose or pitted, minutely pubescent	te, hard	white, very acrid	7 × 6 μ L9		on grassy edge of pine woods; uncommon
37a. ,, var. *roseozonotus* Fr.	differs in cap heing pale lilac-pink with darker zones							rare
(6) **Albati**								
38. *vellereus* Fr.	10-30 cm. white or with yellowish stains, velvety pubescent, compact	distant, thick, white then pale ochre, forked	5-8 × 2½-6 cm. white turns yellow minutely pubescen stout, usually short	te, compact, very crid	white, scanty, very acrid, sometimes with an evanescent sulphur tint	Fresh: white. Old: B 9-11 × 7½-8½ μ with minute warts and network of thin lines L2	Cap + KOH = pale reddish. Flesh + KOH = O Flesh + Fe = orange-buff Milk + KOH = ochraceous orange	leafy woods; common

Species	Cap	Gills	Stem
39. *piperatus* (Scop.) Fr.	7-20 cm. white or with creamy tint, naked, smooth, rigid	densely crowded, white then yellowish, repeatedly forked	3-7×2-5 cm. white, smooth, pru at first, equal o conic
39a. *glaucescens* Crossland	4-6 cm. white then cream or with buff patches, naked, smooth, rigid; margin involute, sometimes stains glaucous-green	densely crowded, very narrow, adnexed, colour of cap	2½-3×1¼ cm. colour of cap, us obconic, solid
(7) **Rubescenti**			
40. *fuliginosus* Fr.	4-10 cm. pale tan or milky coffee, velvety, soft to touch with a somewhat sooty pruine	white then pale tan with flesh tint, stain reddish	4-8×1-1½ cm. white then tan or sr grey, equal or fus
41. *picinus* Fr.	4-8 cm. sepia, almost black velvety	straw yellow, then ochraceous	3-6×1-2 cm. smoky-grey, equal
42. *lignyotus* Fr.	4-10 cm. umbilicate with papillate umbo, sooty brown, paler when old, radiately grooved and wrinkled, pruinose velvety	white then flesh tan, stain reddish	7-12×1-2 cm. colour of cap, redd base, grooved at equal
43. *pterosporus* Romagn.	3-7 cm. with or without papilla, sometimes wrinkled, umber brown, velvety	very crowded and thin, ochre with slight salmon tint then rusty orange, spotted strawberry-red when rubbed	3½-6 cm.×8-12 m whitish then rusty b subequal or fusoi
44. *acris* Fr.	5-8 cm. viscid especially in wet weather, tan to blackish-brown, shiny, often radiately wrinkled	cream then ochraceous	3-8×1-2 cm. white to pale ochre
(8) **Lutescenti**			
45. *chrysorrheus* Fr.	5-8 cm. usually small yellowish flesh colour with darker or orange zones	creamy or flesh colour	5-7×1-1½ cm. white or flesh pruinose, firm, e
46. *hepaticus* Plowr.	2-4 cm. with or without papilla, dark liver-brown, paler near margin, smooth or rugulose, greasy looking; margin often crenulate	crowded, pale flesh colour, then darker and with yellowish tint from milk	3-6 cm.×3-10 m orange-cinnamon, above; equal minate, striate reticulate, soft,
47. *decipiens* Quél.	2-10 cm. reddish-buff or brick-orange often with rusty spots, smooth or very slightly tomentose, often irregular or plicate but margin not usually crenulate as in *hepaticus*	sub-distant, light buff, darker when old and with rusty spots	3-5 cm×5-20 m cylindric or obcon our of cap or smooth or ru apex grooved, p when fresh

Flesh	Milk	Spores	Chemical Reactions	Habitat
te, then yellowish, ery acrid	white, very copious, very acrid	Fresh : white Old : B 6-8×5-6μ with minute warts and a few very thin connecting lines L1	Flesh+Fe=pink Milk+KOH= hyaline	mixed woods ; common
te, turning greenish- ue	white, turns greenish-blue, copious	white 6-7μ sec Crossland (6-9×5-6μ in Kew specimen) L1—L2	soaked in 5% formalin turns bright blue, sec Crossland	deciduous woods ; rare ; not observed in recent years
e, then saffron-red pecially in outline, owly acrid	white turning gills saffron-red, mild, slowly acrid	Fresh : E Old : E spherical 8-10μ L9	Flesh+Fe=cream	mixed woods ; common
ish, reddens slight- , mild then acrid	white, acrid, turns gills yellowish			under conifers ; uncommon
e, then slowly ffron-red, mild	white, changes slowly to saffron-red, mild	Old : E almost spherical 9-11μ L8 but more netted		damp ground under conifers ; uncommon
e, quickly turns ral pink in outline	white, drops drying to red very slowly (after several hours), very acrid	dingy ochre, almost spherical 7-8×6½-7μ L14		damp leafy woods ; (not yet recorded for Britain)
e, quickly reddens, t all red tint dis- pears later, turning own or dingy buff	white, copious, quickly red drying to pinkish white, very acrid			in beech woods especially on chalk, rather rare
e, turns sulphur low, inodorous	white, copious, turns sulphur yellow in drops, tardily acrid	Fresh : pale pinkish buff Old : D 7½-8×6½-6¾μ L7	Flesh+KOH =orange Cap+KOH =olive-straw	chiefly oak ; fairly common
sh-buff, turns yel- ish in cap, mild, wly acrid ; smell nt, pleasant	white, unchangeable on glass or metal, turns yellow on finger and on gills, mild to acrid	Fresh : varies from white to pale buff, Old : C-D ovoid 7-9×6-7μ L9		in pine woods ; very common, especially in late autumn (see note on *theiogalus*)
with slight buff t, tardily acrid er mastication, ell of pelargonium en fresh	white, rather scanty, turns yellow on finger or on gills (not on knife or glass), slowly acrid	Fresh : D Old : D ovoid 7-8×5½-6μ L9		in mixed woods ; fairly common

Species	Cap	Gills	Stem	Flesh	Milk	Spores	Chemical Reactions	Habitat
39. *piperotus* (Scop.) Fr.	7-20 cm. white or with creamy tint, naked, smooth, rigid	densely crowded, white then yellowish, repeatedly forked	3·7×2·5 cm. white, smooth, pruin at first, equal or cl conic	white, then yellowish, very acrid	white, very copious, very acrid	Fresh : white Old : B 6-8×5-6μ with minute warts and a few very thin connecting lines L1	Flesh+Fe=pink Milk+KOH= hyaline	mixed woods ; common
39a. *glaucescens* Crossland	4-6 cm. white then cream or with buff patches, naked, smooth, rigid ; margin involute, sometimes stains glaucous-green	densely crowded, very narrow, adnexed, colour of cap	2½-3×1½ cm. colour of cap, usual obconic, solid	white, turning greenish-blue	white, turns greenish-blue, copious	white 6-7μ sec Crossland (6-9×5-6μ in Kew specimen) L1—L2	soaked in 5% formalin turns bright blue, sec Crossland	deciduous woods ; rare ; not observed in recent years
(7) **Rubescentl** **40.** *fuliginosus* Fr.	4-10 cm. pale tan or milky coffee, velvety, soft to touch with a somewhat sooty pruine	white then pale tan with flesh tint, stain reddish	4-8×1-1½ cm. white then tan or smo grey, equal or fusoi	white, then saffron-red especially in outline, slowly acrid	white turning gills saffron-red, mild, slowly acrid	Fresh : E Old : E spherical 8-10μ L9	Flesh+Fe=cream	mixed woods ; common
41. *picinus* Fr.	4-8 cm. sepia, almost black velvety	straw yellow, then ochraceous	3·6×1·2 cm. smoky-grey, equal	whitish, reddens slightly, mild then acrid	white, acrid, turns gills yellowish			under conifers ; uncommon
42. *lignyotus* Fr.	4-10 cm. umbilicate with papillate umbo, sooty brown, paler when old, radiately grooved and wrinkled, pruinose velvety	white then flesh tan, stain reddish	7-12×1-2 cm. colour of cap, reddis base, grooved at ap equal	white, then slowly saffron-red, mild	white, changes slowly to saffron-red, mild	Old : E almost spherical 9-11μ L8 but more netted		damp ground under conifers ; uncommon
43. *pterosporus* Romagn.	3-7 cm. with or without papilla, sometimes wrinkled, umber brown, velvety	very crowded and thin, ochre with slight salmon tint then rusty orange, spotted strawberry-red when ruhhed	3½-6 cm.×8-12 mm. whitish then rusty brov subequal or fusoid	white, quickly turns coral pink in outline	white, drops drying to red very slowly (after several hours), very acrid	dingy ochre, almost spherical 7·8×6½-7μ L14		damp leafy woods ; (not yet recorded for Britain)
44. *ocris* Fr.	5-8 cm. viscid especially in wet weather, tan to blackish-brown, shiny, often radiately wrinkled	cream then ochraceous	3-8×1-2 cm. white to pale ochre	white, quickly reddens, but all red tint disappears later, turning brown or dingy buff	white, copious, quickly red drying to pinkish white, very acrid			in beech woods especially on chalk, rather rare
(8) **Lutescentl** **45.** *chrysorrheus* Fr.	5-8 cm. usually small yellowish flesh colour with darker or orange zones	creamy or flesh colour	5·7×1-1½ cm. white or flesh colo pruinose, firm, equa	white, turns sulphur yellow, inodorous	white, copious, turns sulphur yellow in drops, tardily acrid	Fresh : pale pinkish buff Old : D 7½-8×6½-6μ L7	Flesh+KOH =orange Cap+KOH =olive-straw	chiefly oak ; fairly common
46. *hepoticus* Plowr.	2-4 cm. with or without papilla, dark liver-brown, paler near margin, smooth or rugulose, greasy looking ; margin often crenulate	crowded, pale flesh colour, then darker and with yellowish tint from milk	3-6 cm.×3-10 mm. orange-cinnamon, above ; equal or minate, striate or reticulate, soft, sol	reddish-buff, turns yellowish in cap, mild, slowly acrid ; smell faint, pleasant	white, unchangeable on glass or metal, turns yellow on finger and on gills, mild to acrid	Fresh : varies from white to pale buff, Old : C-D ovoid 7·9×6·7μ L9		in pine woods ; very common, especially in late autumn (see note on *theiogalus*)
47. *decipiens* Quél.	2-10 cm. reddish-buff or brick-orange often with rusty spots, smooth or very slightly tomentose, often irregular or plicate but margin not usually crenulate as in *hepaticus*	sub-distant, light buff, darker when old and with rusty spots	3-5 cm×5-20 mm. cylindric or obconic, our of cap or d smooth or rug apex grooved, pru when fresh	white with slight buff tint, tardily acrid after mastication, smell of pelargonium when fresh	white, rather scanty, turns yellow on finger or on gills (not on knife or glass), slowly acrid	Fresh : D Old : D ovoid 7·8×5½-6μ L9		in mixed woods ; fairly common

Species	Cap	Gills	Stem
47a. *decipiens* Quél. var. *lacunarum* Romagn.	smaller than type and growing in swampy ground		
48. *tabidus* Fr.	2-5 cm. usually umbilicate with pointed papilla, smooth, matt, rusty buff; margin smooth, striate-sulcate, pallid	pale buff	2-4 cm. × 2-5 mm. equal or clavate, r red, paler above
(9) **Volemi**			
49. *volemus* Fr.	5-12 cm. golden tawny, rufous orange or reddish-brown, paler with age, especially on margin which is rugulose and glabrous	white or yellowish, stain rusty brown when bruised	6-10 × 1½-3 cm. colour of cap, equa obese, hard
(10) **Humiles**			
50. *mitissimus* Fr.	3-8 cm. usually with central papilla when young, bright orange or darker on disk, smooth, matt; margin opaque at first, often striate when old, regular or wavy	orange buff, often stained with rusty spots	3-8 cm. × 8-12 mm. bright orange, paler apex
51. *subdulcis* (Pers.) Fr.	3-7 cm. sometimes with papilla, reddish buff or pale tan, smooth or rugulose, matt	pale buff or with flesh tint	3-5 cm. × 5-10 mm. paler than cap, especi at apex, unequal, r lose
52. *obscuratus* (Lasch) Quél.	1-2 cm. very thin, umbilicate with central papilla, tan or orange buff usually with dark olive centre; margin pellucidly striate (sometimes, but rarely, whole cap is olive or reddish-brown)	pale buff then ochraceous with flesh tint, sparsely stains rusty	1½-2½ cm. × 2-3 mm whitish then buff or colour, pruinose, e
53. *griseus* Peck sensu Kühner	1½-3½ cm. umbilicate often with pointed papilla, brownish grey or smoky grey, breaking up into fine flocculose cracks	dingy cream	1½-3 cm. × 2½-5 mm paler than cap, sm or delicate pruir solid then hollow, e

Cap brownish-grey or smoky; very small; under alders; very rare *L. griseus* (53)

25. All parts creamy-tan or pale clay; in beech woods *L. pallidus* (25)
    All parts pale chamois; in damp pine woods; rare *L. musteus* (18)
26. Gills rich wax colour; cap livid brown . . *L. pyrogalus* (22)
    Not as above 27
27. Cap dark reddish brown:
    Cap dry, with central papilla, common:
    Medium size, peppery . . . . *L. rufus* (34)
    Small; taste mild . . . . *L. camphoratus* (27)
    Cap very viscid, gills pale yellow; very rare . *L. hysginus* (24)
    (See also *hepaticus*.)
    Cap another colour 28
28. Cap umber brown, gills whitish; very rare . . *L. umbrinus* (15)

Flesh	Milk	Spores	Chemical Reactions	Habitat
		ovoid 7-8¼×5¾-6½μ L9		among dead leaves in swampy places, not yet observed in Britain
nkish buff, slightly acrid	white, then yellowish, mild, slowly acrid	pale buff 7-9×5½-7μ isolated warts and a few thin connecting lines L3		peaty ground; not yet recorded for Britain
itish, slowly turns brownish, mild, smell none or of crab	white, mild, copious	Fresh : white Old : A-B 9½-10×8½-9½ L10		mixed woods, especially beech
ite with pale orange contour, mild or bitterish, inodorous	mild, then bitterish or very slightly acrid, unchangeable	Fresh : pale pinkish buff or D Old : D 7-8×6-7μ L7	Flesh+Fe=O	all woods; common
e buff or with rusty int, mild then bitter, mell faint or none	white, unchangeable, fairly copious, mild then bitterish	Fresh : D Old : D 8-9×6-7μ ovoid L7		leafy woods; common; see note
kish buff or pale innamon, often rusty t base, mild, indorous (sec. Neuhoff ften smells of fenureek when dried)	white, unchangeable, rather watery, mild or very slightly acrid	8¾-10×6½-7½μ L6		in swamps, mostly under alder
te, mild, acrid after astication, inodorus	white, scanty	7-8¾×5-6½μ L6	Cap+KOH =rusty orange	under alder; no British record

Cap brownish, covered with felty grey down, acutely papillate; very rare . . . . . *L. mammosus* (32)

29. Cap dry, lilaceous flesh-pink or brick red, usually zoned and with central papilla :
    Spores warted with thin net . . . *L. lilacinus* (36)
    Spores thickly and concentrically cristate . *L. spinosulus* (35)
    Cap glutinous, reddish-brown or dingy flesh-pink *L. hysginus* (24)

30. All parts white or pale buff; milk and flesh turn greenish-blue *L. glaucescens* (39a)

Index and Notes

Lactarius

acris Fr., 44
acris Lange non Fr.=*L. pterosporus*.
aspideus Fr., 12

Species	Cap	Gills	Stem	Flesh	Milk	Spores	Chemical Reactions	Habitat
47a. *decipiens* Quél. var. *lacunarum* Romagn.	smaller than type and growing in swampy ground					ovoid 7-8½×5½-6½μ L9		among dead leaves in swampy places, not yet observed in Britain
48. *tabidus* Fr.	2-5 cm. usually umbilicate with pointed papilla, smooth, matt, rusty buff; margin smooth, striate-sulcate, pallid	pale buff	2-4 cm.×2-5 mm. equal or clavate, rusty red, paler above	pinkish buff, slightly acrid	white, then yellowish, mild, slowly acrid	pale buff 7-9×5½-7μ isolated warts and a few thin connecting lines L3		peaty ground; not yet recorded for Britain
(9) **Volemi** 49. *valemus* Fr.	5-12 cm. golden tawny, rufous orange or reddish-brown, paler with age, especially on margin which is rugulose and glabrous	white or yellowish, stain rusty brown when bruised	6-10×1½-3 cm. colour of cap, equal or obese, bard	whitish, slowly turns brownish, mild, smell none or of crab	white, mild, copious	Fresb: white Old: A-B 9½-10×8½-9½ L10		mixed woods, especially beech
(10) **Humiles** 50. *mitissimus* Fr.	3-8 cm. usually with central papilla when young, bright orange or darker on disk, smooth, matt; margin opaque at first, often striate when old, regular or wavy	orange buff, often stained with rusty spots	3-8 cm.×8-12 mm. bright orange, paler at apex	white with pale orange contour, mild or bitterish, inodorous	mild, then bitterish or very slightly acrid, unchangeable	Fresh: pale pinkish buff or D Old: D 7-8×6-7μ L7	Flesb+Fe=O	all woods; common
51. *subdulcis* (Pers.) Fr.	3-7 cm. sometimes with papilla, reddish buff or pale tan, smooth or rugulose, matt	pale buff or with flesb tint	3-5 cm.×5-16 mm. paler than cap, especially at apex, unequal, rugulose	pale buff or with rusty tint, mild then bitter, smell faint or none	white, unchangeable, fairly copious, mild then bitterisb	Fresb: D Old: D 8-9×6-7μ ovoid L7		leafy woods; common; see note
52. *obscuratus* (Lascb) Quél.	1-2 cm. very thin, umbilicate with central papilla, tan or orange buff usually with dark olive centre; margin pellucidly striate (sometimes, but rarely, whole cap is olive or reddish-brown)	pale buff then ochraceous with flesh tint, sparsely stains rusty	1½-2½ cm.×2-3 mm. whitisb then buff or flesh colour, pruinose, equal	pinkish buff or pale cinnamon, often rusty at base, mild, inodorous (sec. Neuhoff often smells of fenugreek when dried)	white, unchangeable, rather watery, mild or very slightly acrid	8½-10×6½-7½μ L6		in swamps, mostly under alder
53. *griseus* Peck sensu Kühner	1½-3½ cm. umbilicate often with pointed papilla, brownisb grey or smoky grey, breaking up into fine flocculose cracks	dingy cream	1½-3 cm.×2½-5 mm. paler than cap, smooth or delicate pruinose, solid then hollow, equal	white, mild, acrid after mastication, inodorous	white, scanty	7-8½×5-6½μ L6	Cap+KOH =rusty orange	under alder; no Britisb record

Cap brownisb-grey or smoky; very small; under alders; very rare *L. griseus* (53)

25. All parts creamy-tan or pale clay; in beech woods *L. pallidus* (25)
    All parts pale chamois; in damp pine woods; rare *L. musteus* (18)
26. Gills rich wax colour; cap livid brown . . *L. pyrogalus* (22)
    Not as above 27
27. Cap dark reddisb brown:
    Cap dry, with central papilla, common:
    Medium size, peppery . . . . *L. rufus* (34)
    Small; taste mild . . . . *L. camphoratus* (27)
    Cap very viscid, gills pale yellow; very rare . *L. hysginus* (24)
    (See also *hepaticus*.)
    Cap another colour 28
28. Cap umber brown, gills whitisb; very rare . . *L. umbrinus* (15).

Cap brownish, covered witb felty grey down, acutely papillate; very rare . . . . . *L. mammosus* (32)
29. Cap dry, lilaceous flesh-pink or brick red, usually zoned and with central papilla:
    Spores warted with thin net . . . *L. lilacinus* (36)
    Spores thickly and concentrically cristate . *L. spinosulus* (35)
    Cap glutinous, reddisb-brown or dingy flesh-pink *L. hysginus* (24)
30. All parts white or pale buff; milk and flesh turn greenish-blue *L. glaucescens* (39a)

Index and Notes

Lactarius
acris Fr., 44
acris Lange non Fr.=*L. pterosporus*.
aspideus Fr., 12

aurantiacus (Fr. Dan.) Fr. Variously interpreted. Fries stated it was rare but it is usually considered as synonymous with *L. mitissimus* ; by some authors identified as a species confined to larch, better known as *L. porninsis.*
azonites (Bull.) Fr.=*L. fuliginosus.*
blennius Fr., 14
camphoratus (Bull.) Fr., 27
capsicum Schulz. Not known.
chrysorrheus Fr., 45. See note on *theiogalus.*
cilicioides Fr. Hardly distinct from *L. torminosus.*
cimicarius (Batsch) Cooke=*L. serifluus.*
cimicarius (Batsch) Fr.=a form of *L. subdulcis.*
circellatus (Batt.) Fr., 23
confusus Lundell, 31=*glyciosmus* sensu Knauth & Neuhoff.
controversus (Pers.) Fr., 7.
cremor Fr. Not clearly defined.
cupularis Quél. non Bull.=*L. obscuratus.*
cyathula Fr. Much disputed and best withdrawn.
cyathula sensu Ricken=*L. obscuratus.*
decipiens Quél., 47.
var. *lacunarum* Romagn., 47a
deliciosus (L.) Fr., 9
flavidus Boud.=*L. aspideus.*
flexuosus Fr., 37
fluens Boud.=*L. blennius.*
fuliginosus Fr., 40
glaucescens Crossland, 39a. This is a near relative of *L. piperatus,* but seems fully worthy of specific rank.
glutino-pallens Lange, 16
glyciosmus Fr., 30
griseus Peck, 53. May only be a variety of *L. obscuratus.*
helvus Fr., 26
hepaticus Plowr., 46=*L. theiogalus* sensu Rea=*L. obnubilus* sensu Boudier.
hysginus Fr., 24
ichoratus (Batsch) Fr. A much disputed species. Cooke's Ill. 963 (1000) suggests a small form of *L. volemus.* Excluded for the present.
insulsus Fr., 20. The spores are distinct from *zonarius* not only in their large size but in type.
involutus Soppitt. Spores in Cooke's Ill. 1195 (1194) not of a Lactarius.
lacunarum (Romagn.) Lange. Variety of *decipiens.*
lateritioroseus Karst.=*L. spinosulus.*
lignyotus (Lindb.) Fr., 42
lilacinus (Lasch.) Fr., 36. See note on *spinosulus.*
lividus Lamb. Not known and description inadequate.
Mairei Malençon var. *zonatus,* 5. See *The Naturalist,* July-Sept., 1950, 100. The type species was first described from woods of the Atlas Mountains, French Morocco, under *Quercus faginea.*
mammosus Fr., 32
minimus W. G. Smith. Dwarf form of *subdulcis* probably.
mitissimus Fr., 50
musteus Fr., 18
obliquus (Lasch) Fr. Not known. Cooke's Ill. 969 (1014) may be a form of *trivialis.*
obnubilus Lasch=*L. obscuratus.* In *Linnaea* (1828), p. 161, Lasch described *Agaricus obnubilus.* On page 430 of the same volume he rectified this name to *obscuratus* in the following words : 'Error. 71. *Agaricus obnubilus, lege obscuratus.*' For *L. obnubilus* sensu Boudier see note on *hepaticus.* The name has also been used for other species and is only a source of confusion. It should disappear entirely.
obscuratus (Lasch) Fr., 52=*L. cyathula* Ricken non Fr.
pallidus (Pers.) Fr., 25
pargamenus Swartz=young and slender form of *L. piperatus.*
picinus Fr., 41
piperatus (Scop.) Fr., 39

plumbeus Fr., 6
porninsis Rolland, 21
pterosporus Romagnesi, 43=*L. acris* Lange non Fr.
pubescens Fr., 8
pyrogalus (Bull.) Fr., 22
quietus Fr., 29
repraesentaneus Britz., 3
resimus Fr., 2
retisporus Mass.=*L. fuliginosus*.
roseozonatus Fr., 37a
rubrocinctus Fr., 33
rufus (Scop.) Fr., 34
sanguifluus (Paul.) Fr., 10. Included in the British list but almost certainly by mistake. It is a more southern species, found in countries where the vines grow : *in zona vitis, vix ultra* as Bresadola puts it.
scoticus B. & Br. Uncertain ; the figure in Cooke's Ill. 938 (1004) suggests *L. pubescens*.
scrobiculatus (Scop.) Fr., 1
serifluus (DC.) Fr., 28
spinosulus Quél., 35. Contrary to what is generally believed, this is distinct from *L. lilacinus*. The spores are of an entirely different type.
squalidus (Krombh.) Fr. Of dubious identity.
subalpinus Kühner. May be a form of *L. subdulcis*.
subdulcis (Pers.) Fr., 51. This very common Lactarius requires more detailed observation.
subumbonatus Lindgr. Probably *L. camphoratus*.
tabidus Fr., 48. Variously interpreted, but here adopted in the sense of Konrad & Favre, *Bull. Soc. Myc. Fr.* LI, p. 152 (1935). See also *Icon. Sel. Fung.*, Pl. 32, II, Konrad & Maublanc. It is one of the minor species we are apt to pass over as *L. subdulcis* from which it differs in the yellowing milk and spores with isolated warts and very few thin connecting lines.
theiogalus Fr. Authors interpret this species in so many different ways that the sooner the name disappears the better. For Quélet and Bresadola it was the same as *chrysorrheus* and that in fact was the *theiogalus* of Bulliard (Pl. 567, Fig. II) but not of Fries. In the English tradition *L. theiogalus* is the rather dull-looking Lactarius that we see in vast numbers rather late in the autumn under *Pinus sylvestris*. It was clearly described by Rea (*Trans. Br. Myc. Soc.*, I, p. 117, Pl. V) except in the behaviour of the milk which does not turn yellow when isolated on a knife-blade or on glass, but stains the gills yellowish and will turn colour on one's finger. For this species it is best to adopt *L. hepaticus* Plowr., which in our tradition is the same species though Boudier's figure is not good. On the other hand his figure of *L. obnubilus* is exact except for the milk, but the yellow change escaped nearly all the old authors. However, *obnubilus* must go, having been used for other species. For Ricken *L. theiogalus* was not far removed from the last, but paler and better known as *L. decipiens* Quél. For Knauth & Neuhoff it is one of the satellites of *subdulcis*, the one having spores with almost isolated warts and yellowing milk for which it is convenient to use *tabidus*. In America *L. theiogalus* seems to be something entirely different. What Fries had in mind nobody knows !
tomentosus (Otto) Cooke. Not known.
torminosus Fr., 4
trivialis Fr., 17
turpis Fr.=*plumbeus*.
umbrinus (Pers.) Fr., 15. Remains in list, but this rare and little-known Lactarius has not been found for years.
utilis (Weinm.) Fr.=*L. musteus* Fr.
uvidus Fr., 11
vellereus Fr., 38
vietus Fr., 13
violascens Fr., 11a
volemus Fr., 49
zonarius (Bull.) Fr., 19. Some authors have called the species with bisporous basidia and large spores *L. zonarius*, but the more general interpretation is to identify this with *L. insulsus*. It is hoped that this interpretation will stand.

A NEW LACTARIUS

A. A. PEARSON, F.L.S.

Lactarius Mairei Malençon in *Bull. Soc. Myc. Fr.*, LV., pp. 34-41, Pl. 1 (1939) var. **zonatus** n. var.

Habitat : in mixed woods probably under oak, West Dean Park Arboretum, Sussex, 30th August, 1948.

Cap : 5-6 cm. fleshy, convex then depressed, somewhat viscid at first, dark orange buff in centre which is smooth, elsewhere paler with several darker concentric zones and with adpressed or slightly recurved reddish-brown scales ; margin incurved, covered with shaggy brown hairs.

Gills : crowded, narrow, linear (3-4 mm. wide) mostly one length but some smaller, pale orange buff, adnate sub-decurrent, rather thick, edge smooth.

Stem : 4-6 cm. long, 1-1½ cm. thick, orange buff, paler at apex, delicately pubescent when young, smooth or rugulose, equal, firm outside with spongy interior.

Flesh : very pale buff, acrid, with strong but pleasant smell.

Milk : white, copious, unchangeable, very acrid.

Spore Powder : when fresh D, when old D of Crawshay's Spore Colour Chart (Cartridge Buff of Ridgway).

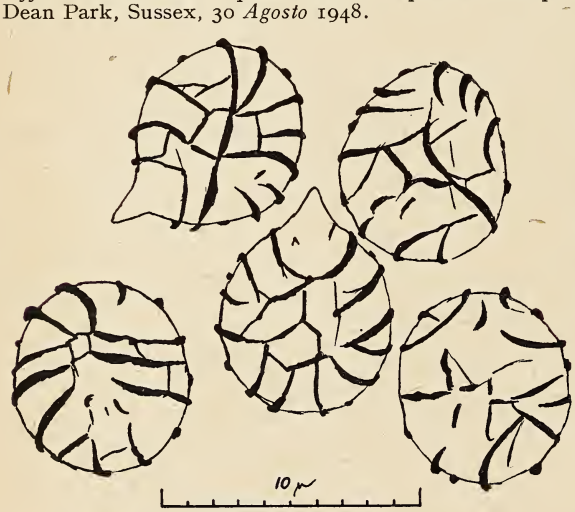
Spores : almost spherical 7-7½ × 6½-7μ excluding apiculus and surface markings ; cristate with partial or complete fairly thick reticulation ; the cristate protuberances merge into each other by thin or thick connecting lines.

Basidia : 4 spored.

Cystidia : on gill edge lanceolate, long and very pointed, projecting well beyond gill edge and fairly abundant, blue-black in sulpho-vanillin (sec. Malençon they are sometimes septate near apex).

Scales on Cap : with long hyphae 3-3½μ diameter, blue-black in SV.

Latin Diagnosis : *Lactarius mairei* Malençon var. *zonatus* Pearson *a typo differt colore clariore, pileo zonato et sporis leviter parvioribus. Ad terram* West Dean Park, Sussex, 30 *Agosto* 1948.



Lactarius Mairei has not hitherto been recorded for Europe. It was first discovered in 1937 under beech oak (*Quercus faginea*) in the woods of the Atlas Mountains, French Morocco. The above description is from the British specimens and differs from the original diagnosis in several details which are hardly of specific importance. They do however, call for a varietal epithet. Our specimens were rather brighter in colour, the pileus was distinctly zoned and the spores were slightly smaller though with the same shape and ornamentation. *L. mairei* var. *zonatus* looks like a brown *L. torminosus* from which it differs not only in colour but in size and shape of spores and in habitat. It is, however, more likely to be confused with *L. zonarius* from which it can be distinguished by its less robust stature, scaly cap, shaggy margin and paler spore powder.

In the arboretum where it was found, no *Quercus faginea* was seen but other oaks are present : *Q. pedunculata* and several North American species (*Q. velutina, coccinea, rubra*). At present it is not possible to say with which tree our *Lactarius* was associated.

The arboretum at West Dean Park is on chalk soil, but as the ground dips considerably there may be pockets of non-calcareous soil over the chalk.

A NEW RUSSULA

A. A. PEARSON, F.L.S.

Russula cessans nov. sp.

Habitat : on ground under *Pinus sylvestris* in troops, Witley Common, Surrey, late autumn, November 15th-28th, 1949.

Cap : 3-7 cm. convex then plano-depressed, viscid, matt when dry, dark crimson or dull violaceous purple with blackish centre, sometimes with brown tint, often with minute cracks, cuticle half peeling ; margin smooth or inconspicuously striate-tuberculate in large specimens.

Gills : crowded or subdistant, white at first, then cream, finally ochraceous, adnexed sometimes emarginate, arcuate or cuneiform, rounded in front, equal or with a few short ones, occasionally forked.

Stem : 3-5 cm. long, 1-2 cm. thick, subequal, firm, white, finely veined.

Flesh : white, unchangeable ; reaction to Iron Sulphate ($FeSO_4$) salmon pink.

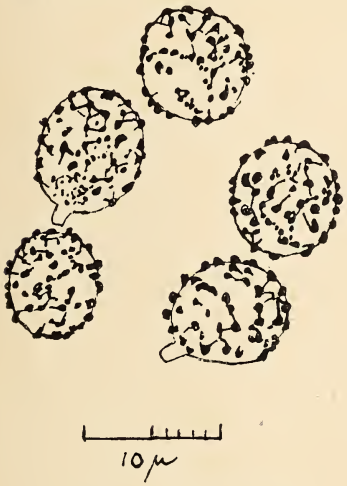
Taste : mild.

Smell : faint or none.

Spores : in mass bright ochraceous (G of Crawshay's Spore Colour Chart), subglobose, amyloid, warted and partly reticulate with thick and thin lines, 8-9½×7½-8μ.

Cystidia : on gill edge, sparse, fusoid, 7-9μ wide, staining blue-black in sulphovanillin (SV).

Pileocystidia : sparse, 4-6μ thick at apex with long tail and staining blue-black in SV.



***Russula cessans* Pearson**

apoc. N.A1-2. O x 25
magnification due to lenses alone 1500

Latin Diagnosis :

Russula cessans Pearson

Habitat ad terram in pinetis gregatim, tarde autumno 15-28 *Novembre* 1949 *Witley Common, Surrey. Pileus* 3-7 *cm. e convexo plano-depressus, viscidus, sicco impolitus, obscure rubro-purpureus, violaceus vel brunneo-tinctus, centro nigro, cute saepe minute diffracta ; margine plerumque plano vel in speciminibus majoribus vix tuberculoso-striato ; pellicula semi-secernibili. Lamellae confertae vel subdistantes, aequales vel paucae earum breviores, albae dein cremae, denique clare ochraceae, adnexae, arcuatae vel cuneiformes. Stipes* 3-5 *cm. longus,* 1-2 *cm. crassus, subaequalis, firmus, albus, subtiliter venosus. Caro alba immutabilis ope solutionis* $FeSO_4$ *salmo-rosea, mitis, inodora. Sporae in cumulo clare ochraceae* (G. Crawshay) *subglobosae, amyloideae, verrucosae partim reticulatae lineis crassis tenuibusque* 8-9½×7½-8μ. *Cystidia in acie lamellarum sparsa fusoidea* 7-9μ *lata, ope solutionis cui nomen 'sulphovanillin' nigro-caerulescentia. Pileocystidia sparsa* 4-6μ *crassa cauda longa praedita etiam ope SV nigro-caerulescentia.*

The species described above has not been entirely overlooked. It is one of the *Russulae* involved in the discussion some years ago between the late J. Schaeffer and R. Singer concerning the identity of *Russula Turci* Bres. This matter was briefly dealt with in *Trans. Br. Myc. Soc.*, XXII, pp. 40-42 (1938) when perhaps I expressed myself with unjustified impatience. Dried specimens distributed by Bresadola himself proved to be of several species and this gave rise to much confusion and heated debate. It is hardly necessary to recall the details. Dr. Rolf Singer tells me that two of the exsiccata in question are at the Farlow Herbarium, Harvard, and New York Botanical Gardens, the latter being in fact the species now described. Having found this unfamiliar *Russula* growing in abundance under Scotch Pine, I communicated with several *Russula* experts and all agreed

that it was worthy of a new description. I am indebted to the following for so kindly replying to my letters : H. Romagnesi, V. Melzer, Rolf Singer and Richard Crawshay. The last I have to thank for the *camera lucida* drawings of the spores which greatly enhance the value of the diagnosis. Later I hope to provide a coloured plate for this species which is evidently widespread and may be fairly common.

Russula cessans Pears. differs from *R. Turci* Bres. in colour, absence of the characteristic iodoform smell and the presence of cystidia in the cuticle of the pileus. The cystidia on the gills colour blue-black in sulphovanillin, but there is no such blue reaction in those of *R. Turci*.

The nearest relative is *Russula capensis* Pears., a description and coloured plate of which will shortly appear in the *Transactions of the British Mycological Society*. The Cape *Russula* grows in a great variety of colours and in vast numbers in the pine woods of South Africa and especially under the stone pine (*Pinus pinea*). The colours of *R. cessans* are duller, it is not so viscid, the spore powder is very slightly paler and the spore ornamentation a little denser—all rather subtle points which would have less significance if the two species were not separated by a distance of some six thousand miles. They may eventually be proved to be not distinctive enough to deserve separate names, in which case whichever of the two species is first published will have priority.

WINTER FOOD OF ROBIN

E. STUBBS

A Robin in juvenile plumage (subsequently proved to be male) first made his appearance at my back door (Marple, Cheshire) in the late summer of 1944 and soon began to come within for food. A dish was kept inside supplied with finely-cut cheese-rind, fat, bread and pastry crumbs, etc. With cheese among the food he returned frequently at short intervals, picking out the cheese fragments, and ignoring other things for the time being. With the door closed he would perch on the window-sill peering into the kitchen and whistling, apparently to attract attention ; and at times, with no one in the kitchen, he would try the other windows. To preserve his territory he had many fights with other Robins. He continued to come at all seasons until the end of March, 1949. In the breeding season he carried food away frequently, presumably to a mate or young. Once a mate came with him, but was too timid to go to the food.

In 1946, before beginning to feed, the Robin was seen to open his bill widely, stretch out his neck with a heave, and regurgitate a pellet. Similar pellets were ejected on other occasions, and Mr. W. D. Hincks has been good enough to analyse four that were kept. The habit, of course, is not unusual, but many people who are interested in birds do not seem to have witnessed it. This evidence of the food that Robins obtain naturally in winter will probably be of interest.

Robin Pellets (analysed by W. D. Hincks, F.R.E.S., M.S.B.E.)

No. 1. *January 20th*, 1947.—Almost entirely vegetable matter and fibres. Some grit. Two whole seeds and fragments of same. Small traces of insect fragments. *No* earthworm chetae.

No. 2. *Without date.*—No grit. Some vegetable matter including entire thalloid plant with five rhizoids intact. One seed. Earthworm chetae almost absent, very few indeed. One Chalcid (parasitic Hymenoptera). One beetle, Carabid? One spider. One Proctotrupid (parasitic Hymenoptera). Other undetermined insect remains.

No. 3. *December 18th*, 1948.—Two Hawthorn seeds. Vegetable fragments. Earthworm chetae. One fly (Diptera, Muscoid?). One Caterpillar (Lepidoptera). One moth. One spider. One beetle.

No. 4. *December 22nd*, 1948.—One Hawthorn seed. Much vegetable fragments and bits of a moss. One whole seed. Many pieces of quartz, etc. Earthworm chetae. One Psocid (? accidentally included). One beetle, *Notiophilus* sp. One beetle; weevil? Two flies (Diptera). Several spiders. One fly larva, Tipulid.

ON THE ENEMIES OF MYRIAPODS

PAUL A. REMY,

Laboratoire de Zoologie générale, Université de Nancy.

In a recent enquiry regarding the significance of enemies (predators and parasites) on the density of Myriapod populations, Capt. J. L. Cloudsley-Thompson describes a number of original observations, and gives a summary of the principal results of his bibliographical researches (*Naturalist*, 1949, pp. 137-141). The object of the present article is to supplement that part of his interesting study concerning the parasites of Myriapoda, and to extend the bibliography.

BACTERIA AND FUNGI

Myriapods may be attacked by a number of bacteria and fungi. Schizophyta, among them bacteria, *Arthromitus* and *Cladophytum* (Leidy, 1849, 1850 *a*), *Fusiformis legeri* (Grassé 1926 *a*, *b*) and *Streptothrix* occur in the alimentary canals of Diplopoda. *Fusiformis* lives on the Flagellate *Polymastix legeri* Grassé, a parasite of Glomerids. Inadequately described entophytes have been recorded from the anterior intestine of a *Cryptops* (Plateau, 1878) ; and Balbiani (1889) described three forms from the Chilopoda : *Omphalocystis plateaui*, *Mononema** *moniliforme* and *Rhabdomyces lobjoyi*. According to Duboscq (in manuscript) an undetermined yeast fungus may invade the blood of *Scolopendra*, while *Brachydesmus* is sometimes severely infected with Phycomycetes (Schubart, 1934). A Hyphomycete of the genus *Alternaria* lives in the intestine of *Glomeris marginata* Villers (Toulouse and Tuzet, 1947).

Laboulbeniales have been found in the following European Iulidae : *Hypsoiulus alpinus suevicus* Verh. *f. boletiferus* Verhoeff (1916), *Ophyiulus* sp. (Dahl, in Schellenberg, 1923 ; Schubart, 1934), *Trogloiulus mirus* Manfredi (1931), *Stenophyllum hermanni-mülleri* Verhoeff (1897) and *Unciger* sp. (Verhoeff, 1926 *a*). The parasite of *Hypsoiulus* is possibly a *Laboulbenia*, that of *Ophyiulus* a *Rickia*. Trichomycetes (=Eccrinids) have frequently been found in the posterior intestine of numerous Diplopods from such diverse localities as Europe, Indo-China, Africa, and America. Of the family Eccrinaceae, the following genera are represented : *Eccrina* (three spp.), *Eccrinoides* (two spp.), *Enterobryus* (12 or 13 spp.). Details are given by Duboscq, Léger and Tuzet (1948).

Although on the whole Myriapods do not seem to be inconvenienced by these parasites, *Scolopendra* may succumb to the yeasts living in its blood.

Moulds are the worst enemies of Myriapods, attacking eggs and young more frequently than adults. Their victims are particularly numerous in terrarium breeding cultures, where conditions are more or less unfavourable, promiscuity is rife, and in many cases the eggs and young of ' incubator ' species are abandoned too early by the female whose presence around her progeny would normally protect them from bacterial and fungal infection.

PROTOZOA

Numerous Flagellates inhabit the alimentary canal of Diplopoda. *'Bodo' julidis* Leidy (1850 *b*, 1853 *b*, 1856) lives in the North American *Spirobolus spinigerus* Wood (=*S. marginatus* Say) ; while *Polymastix legeri* Grassé (itself a prey to an undetermined Bacterium and *Fusiformis legeri* Grassé), an *Octomitus* (perhaps *O. minimus* Hasselmann), and a *Monoceromonas* (which often resembles an *Eutrichomastix*) are to be found in the rectal contents of French Glomerids (Grassé, 1926 *a*, *b*). *Polymastix nitidus* Hasselmann (1928), and *Eutrichomastix rhinocrini* da Fonseca (1928) have been described from the intestine of Brazilian species of *Rhinocrinus*.

Sporozoa have been found in various Myriapods : Gregarines in the Symphyla *Scutigerella immaculata* Newp. (Verhoeff, 1933), *Hanseniella hova* Remy (1942), and *H. agilis* Tiegs (1945) ; Gregarines and Coccidia in very many Diplopoda and Chilopoda. Microsporidia have also been found in the Symphyla : an undescribed form in the peri-intestinal adipose tissue of *S. immaculata* (R. Poisson, unpublished observation), a second species, *'Nosema' geophili* Crawley (1903) in the intestine of a centipede, *Geophilus* sp.

* The name *Mononema* is preoccupied by an Orthopteron described by J. Gistl (1848, *Naturg. Thierr.*, Stuttgart p. 138.)

Ciliata of the genus *Nyctotherus* have been found in a few Diplopods, including *Spirobolus spinigerus* and *Spirostreptus* sp. in America, and possibly '*Iulus terrestris*' in Europe (Leidy, 1849, 1850 *b*, 1853 *b*, 1856; d'Udekem 1859; Grassé 1928). In addition some forms with doubtful affinities have been described. These include *Chytridiopsis schneideri* Léger and Duboscq (1909) in *Lithobius mutabilis* L.K., *C. pachyiuli* Granata (1929), *Chytridioides schizophylli* Trégouboff (1913), and *Ophryomyxa pachyiuli* Granata (1925) in Diplopoda.

None of these parasites appear to exert a harmful effect on their host.

CESTODA

Several Diplopoda are the intermediate hosts of Cestodes of the related families Dilepididae and Hymenolepididae; the cysticercoids of *Anomotaenia constricta* Molin, *Hymenolepis pistillum* Duj. and *H. scalaris* Duj. have been found in some species of *Glomeris*; those of *H. diminuta* Rud. in the Polydesmoid *Fontaria virginiensis* Drury, *Iulus* sp., an undetermined Diplopod (and also various insects). The enigmatic prolific *Urocystis prolifer* Villot has been found only in *Glomeris marginata*.

NEMATODA

Nematoda have never been found in Pauropoda and to my knowledge only one has been found in Symphyla (*Scutigerella immaculata*; unpublished observation of H. Ribaut who did not identify the parasite). Nematoda were found in Diplopods and Chilopods, more rarely in the latter than in the former; they are particularly Oxyuriforms of the genera *Haplacis, Thelastoma, Streptostoma, Severianoia, Fontonema, Ransomnema, Carnoya, Augra, Clementeia, Rhigonema, Dudekemia, Ichthyocephalus*, and Mermithiforms.

NEMATOMORPHA

Some Diplopoda and Chilopoda are parasitised by Nematomorpha (Dorier 1929-1936): *Glomeris marginata, G. humbertiana* Sauss., *Lithobius forficatus* L., *Scolopendra cingulata* Latr., and *Scolopendra* sp. by *Gordius aquaticus* Duj., and *Iulus* sp. by *Parachordodes alpestris* Villot.

Neither flat-worms nor round-worms appear to harm their hosts.

DIPTERA

Larvae of the Phorid fly *Megaselia* (*Aphiochaeta*) *juli* Brues (1915) have been found in a number of millipedes, particularly '*Iulus*' sp. and *Spirobolus spinigerus* in North America, where the larvae of *A. xantippe* Banks also parasitise Myriapods. In France, the larvae of *A. cuspidata* Schmitz have been found in *Schizophyllum sabulosum* L. (Picard, 1930), and the Anthomyid *Eginia ocypterata* Meigen parasitises several European Iulidae (Verhoeff 1926 *b*; Schubart, 1934). Thompson (1915) discovered larvae of Diptera including *Fortisia foeda* Meigen in *Lithobius* sp. in England. This species should perhaps be combined with *Thryptocera lithobii* Giard (1893) which is included in the genus *Discochaeta* by Tölg (1912) and Attems (1926). The larvae of this species parasitise *Lithobius* around Paris. Larvae of undetermined Diptera have been found in Myriapods by Haase (1885), Verhoeff (1896, 1926), and Wernitzsch (1910). Dimmock (1884) saw a '*Iulus*' in Cambridge, Mass., overcome by a swarm of minute Diptera which he supposed to be attracted by the secretion of its stink glands. I think it more likely, however, that the insects were trying to lay their eggs in its body.

Roubaud (1916) found a millipede in Brazzaville, parasitised by adult Borborids (*Limosina pallidicornis* Villeneuve). In addition its alimentary canal contained some young Muscid larvae, and eggs which he attributed to the same parasite. It was presumed that the eggs had been swallowed by the millipede, and hatched in its intestine. *Limosina* is probably but an occasional and temporary parasite.

Lintner (1884) relates that a friend saw a swarm of minute 'gnats' hovering over a '*Iulus*' and darting at it. The insects appeared to be puncturing the Diplopod and the observer asked, 'Were they Ichneumons? If not, what were they?' If not Hymenoptera, they were probably Diptera.

The parasitic Diptera often kill their Myriapoda.

HYMENOPTERA

Newmann (1866) found 21 nymphs of the Proctotrupid *Phaenoserphus calcar* Haliday, firmly attached by their posterior ends to the ventral side of a dead *Lithobius forficatus* which they had presumably killed. E. H. Rübsammen (in Verhoeff, 1915) saw in Rhenany some larvae of the Proctotrupid *Cryptoserphus ater* Nees, issuing from an *L. forficatus* which had succumbed to their attacks. According to O. Schmiedeknecht (in Verhoeff, 1915) and Attems (1926), Proctotrupids of the genera *Disogmus* and *'Codrus'* parasitise *Lithobius*. Planidium larvae have been seen in Myriapods : *Gymnostreptus parasitarius* Schubart (1947) in Brazil, and *Lithobius* sp. in England (Thompson, 1915).

COLEOPTERA

A larval Lampyrid introduces itself through the anus into the posterior intestine of *Pachyiulus*.

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ORNITHOLOGICAL REPORT FOR NORTHUMBERLAND AND DURHAM FOR 1949

Compiled from the records of members of the Ornithological Section of The Natural History Society of Northumberland, Durham and Newcastle upon Tyne and many other local observers, by George W. Temperley.

(A key to the initials used in this Report will be found at the end of these notes. Abbreviations used : N.=Northumberland ; D.=Durham ; *B.B.=British Birds* ; *O.R:=Ornithological Report* ; *F.I.O.R.=Farne Islands Ornithological Report*, 1949.)

The number preceding the name of each species refers to Witherby's *Handbook of British Birds*, where the full scientific name will be found.

Where reports are placed in square brackets it is implied that, being sight records only, some slight element of doubt may exist as to the accuracy of the identification, or that the bird was not truly wild.

Notes have been received from 120 observers. Unfortunately, owing to lack of space, only a limited number of these could be included in this Report ; but all are most helpful in assessing the status of the various species in the two counties. New contributors will be welcomed, particularly those who are able to report from outlying districts.

It will greatly help the Compiler if observers will :-

(*a*) Arrange their notes in the order used in this Report.
(*b*) Send notes at more frequent intervals.
(*c*) Give full details of the characters by which rare or not easily identifiable species were recognised in the field. Where this is not done, records cannot be accepted.

For the benefit of other members, observers are asked to report *immediately* if they see rare or unusual birds, so that an interesting experience may be shared.

All notes should be addressed to G. W. Temperley, Hancock Museum, Newcastle upon Tyne.

Records of unusual interest dealt with below are : Rose-coloured Starling (16), Breeding of Siskin (21), Twites inland in breeding season (29), Breeding of Nuthatch in Durham City (96), Red-backed Shrikes (119), Large invasion of Waxwings (120), Red-breasted Flycatcher (125), Breeding of Stonechat on coast (198), Red-spotted Bluethroat (205), Lesser Spotted Woodpecker (238), Breeding of Montagu's Harrier for the third consecutive year (272), Red-footed Falcons (265), Ospreys (284), Leach's Fork-tailed Petrel (351).

Weather Conditions in 1949

The year will be remembered for its very mild spring, long dry summer and early harvest-time. Every condition was favourable for breeding birds and a most noticeable increase took place in many of those species which had been reduced in numbers during the severe winter of 1946-47, such as the Wren, Song-thrush, Dipper and Kingfisher.

The Wildfowl Census

A year's experience having shown that some of the inland waters and certain sections of the coast were not the resort of a sufficient number of wildfowl to repay the trouble of visiting them, they have now been omitted and a more intensive survey is being made of the more important districts. Thirty-six census takers are now enrolled and between them they visit 40 inland waters and about 50 miles of coast. The dates upon which counts were made were : January 1st and 29th, March 5th and 26th, April 23rd, July 24th, August 21st, September 25th, October 23rd, November 20th and December 18th. The willing co-operation of all those who took part is gratefully acknowledged.

Farne Islands Ringing Committee

The Farne Islands Committee of the National Trust authorised The Natural History Society to carry out, on its behalf, all bird ringing done on the Farnes. A Ringing Committee has been appointed with H. Tully as Chairman and Miss

G. Watt as Honorary Secretary. Three expeditions to the Islands were made and a total of 836 birds was ringed.

Gosforth Park Bird Sanctuary

A list of the birds resident or visiting the Sanctuary is being compiled. Any past or present records will be welcomed from observers.

Nesting-box Experiments

In the Forestry Commission's plantations near Hamsterley, Co. Durham, 300 nesting boxes were put up for the 1949 breeding season. Of these only 87 were occupied. The occupants were of the following species:- Pied Flycatchers 28, Redstarts 14, Great Tits 29, Blue Tits 9, Coal Tits 2. One nest was unidentified, two contained dead young and two were destroyed. The majority of the unused boxes were those situated in the thickest plantations. Pied Flycatchers were induced to breed from 100 to 200 yards from the streams and Redstarts from 60 to 100 yards, but only where oak and ash trees were present. Great Tits nested from 75 to 100 yards away from water.

The 28 pairs of Flycatchers reared 156 young, an average brood size of 5·6 (compare 1948 5·7 and 1947 5·7). The 14 pairs of Redstarts reared 84 young, an average brood size of 6. The 29 Great Tits raised 190 young, an average brood size of 6·55 (compare 1948 3·3 and 1947 7·8). The 9 Blue Tits raised 67 young, average brood size 7·5 (compare 1948 9·6 and 1947 9·1). The two pairs of Coal Tits raised 13 young, average 6·5. These figures are interesting, but the numbers dealt with are still too small to be of much value for statistical purposes. We are indebted to Mr. C. H. Longstaff for the above information.

In the gardens at Blagdon, N., birds were encouraged to nest in empty flower-pots nailed up against tree-trunks, etc. 19 pots were occupied by the following species: Redstarts 9, Great Tits 3, Blue Tits 1, Robins 2, House-sparrows 3, and Tree-sparrow 1. (M.W.R.)

Classified Notes

1. Raven.—Cheviot sites: On April 9th a nest was located containing three partly fledged young; both adults were seen at the site (W.R.L.). On April 19th at another Cheviot site a new nest was found with a pair in possession, but the contents of the nest could not be seen (A.J.C.). Coquetdale sites: On March 13th a newly-lined nest was found with a pair of birds soaring nearby (R.C. and D.R.S.). At another site during the second week in May four nests were located, two with well-grown young and two empty. At one of these sites there were three adult birds; while a fourth was found shot (R.C.). On May 30th at one of these sites at least three adults and three young were seen (M.W.R.). At another Coquetdale site the adults and young were shot by the shepherd (R,C.). On Falcon Clints, on the Durham side of the Tees, no Raven has nested since 1946 (H.W.). On Peel Fell, beyond Kielder, just across the Border, a nest containing three young was found in a tree (J.D.T.). It is long since tree-nesting by this species was recorded in Northumberland. In mid-September, on one occasion only, a pair was seen in Lambton Park, D. (J.W.).

2. Hooded Crow.—On about May 21st, R. Bertram, a Harbottle gamekeeper, shot, at the nest, a Hooded Crow mated with a Carrion (per T.G.W.). Inter-breeding between these two species does not often occur south of the Borders. On June 30th a hybrid Corbie-Hoodie was seen at Beal, N. (J.M.C.). Less numerous about Craster, N., than last year. First seen October 16th. Five repeatedly seen near Cullernose Point, N. (W.S.C.). At Alnmouth, N., last seen April 16th, one; first seen on October 9th, one (H.T.). Many more than normal about Blagdon, N., this winter; on December 20th near Blyth a flock of 15 (M.W.R.). A few visit Darlington Sewage-farm each winter (A.B.).

3. Carrion Crow.—More plentiful than ever. The Northumberland Agricultural Committee, in an attempt to reduce the numbers, organised 'crow shoots' at some of the main winter roosting sites. The Gosforth Park roost, which normally consists of some 100 to 200 birds, was shot on March 2nd, 9th and 16th, the total bag amounting to 54 birds. After this shoot a definite decrease was noticed in the nesting population on the Blagdon estate east of the Great North Road and south of the River Blyth—only one nest where normally a dozen. The north-west portion of the estate had its normal very high density, probably because

the roost at Cock Hill was not shot (M.W.R.). The Gosforth roost was used again in the autumn, when, on October 14th, 60 birds were counted (R.G.G.). On April 8th in the Tritlington area, N., nine newly-lined nests were found in the few trees around three fields (D.R.S.).

4. Rook.—Early building record : On January 22nd at Meldon, N., one was seen carrying nesting materials (H.W.K.).

7. Magpie.—In June last year an albino specimen was taken from a nest near South Moor, Stanley, D., and is now in the Hancock Museum (see *O.R.* 1948). This year another young albino was found close to the spot where the first was taken (L. Bennett). During the last three years it has been noticed that no birds were present in the Gosforth-Backworth area from July to October. It would appear that local breeding pairs leave in late June or July and that larger numbers, usually in flocks, appear again in October and remain until March (C.A.B.). Further evidence in support of this would be welcome from other parts of the counties.

14. Starling.—A flock has been roosting nightly in the reed-bed at Gosforth Park. In late October there were about 40 birds, increasing by mid-December to *c.* 250 (C.A.B.). During October *c.* 200 birds roosted nightly in Bents Park, South Shields ; but later they deserted this site and were seen flying southwards in the direction of Sunderland (J.C.C.) ; where there is a large roost near Cleadon (F.G.G.).

A bird, ringed as an adult in Edinburgh on March 2nd, 1948, was recovered at Horncliffe, N., in December, 1948 (*B.B.*, XLII, p. 264). A bird, ringed as an adult at Seaham, D., on March 13th, 1947, was recovered at Elmham, Norfolk, on May 5th, 1949 (*B.B.*, XLII, p. 264).

16. Rose-coloured Starling.—On June 26th at 6-30 p.m. an adult cock was seen to fly across the garden at Apperley Dene, Stocksfield, N. It perched on some pea-sticks where it was examined at very close range in a good light. It left the garden on being mobbed by some House-sparrows and was not seen again (G.A.C.).

18. Hawfinch.—On May 8th a nest with three eggs was found near Blagdon, N., an early date (M.W.R.). A pair bred in Gosforth Park. The nest was located in a tall beech tree. On June 15th three young had left the nest (C.A.B.).

20. British Goldfinch.—Reported nesting near Elsdon, N. (R.C.) Has begun to breed about Blagdon, N. (M.W.R.). Breeding successfully and in increasing numbers about Darlington (K.L.).

21. Siskin.—This year, not far from Haltwhistle, N., a pair was located and a nest with four eggs found in a low spruce tree. In the previous year, two nests were found near Haltwhistle with clutches of four and five eggs, also in low spruce trees. Other birds were seen in the breeding season, but no further nests found (M.P.).

Winter flocks were reported to be fewer and smaller than usual.

23. Mealy Redpoll.—On March 20th near the Black Lough, Edlingham, N., on alders, three in a flock of about 30 Lesser Redpolls (J.R.C.). On December 11th on the Beal and Goswick shore, N., ten were clearly identified and others present amongst unusually large flocks of Lesser Redpolls (C.A.B.).

25. Lesser Redpoll.—On May 10th near Craster, N., a flock of from 45 to 50 was seen—a late date for so large a flock (J.M.C.).

' On July 7th, 1949, I ringed a brood of six nestlings at Whiteleas near South Shields. I have been notified that one of them has been recovered near Brussels on October 25th—the first record of migration to the continent ' (F.G.G.).

29. Twite.—Since 1935, when the Ornithological Reports were first issued, the only records of Twites have been birds seen on the coast, evidently on migration. We have recently asked observers to search for them on the moorlands in the breeding season. We have now received the following reports : On May 25th on the Usway, above Shillmoor, N., a pair seen (E.M.). On August 3rd on the slopes of Puncherton Hill, in the Alwin Valley, N., a flock of eight seen (R.C.). On August 6th in the Harthope Valley, Cheviot, three seen, on the 7th two and on the 8th two (C.A.B.).

' Never known to breed in S.W. Northumberland. Thirty years ago large flocks used to visit N.W. Tynedale and scores could be seen feeding on moorland pastures. Now only a few come occasionally. Last February I saw two feeding on moorlands above Haltwhistle ' (M.P.).

36. Common Crossbill.—On April 16th a pair was seen in Dipton Wood, N. ; a slight warbling and trilling song was heard from the cock (H.R.O.). On June 12th a pair was seen near Shotley Bridge, in a wood on the Edmundbyers road (J.C.). A subsequent search failed to find them there (C.H.). On June 22nd a cock and another bird which may have been its mate were seen in Dipton Wood, near the spot where they have been seen in previous years, but no nest was found (K.I.). In mid-June a single bird was seen on two occasions in N.E. Gosforth Park (C.A.B.).

42. Brambling.—Very few indeed reported in the autumn and winter. Near Alnwick the usual flocks failed to appear ; only a few odd birds seen in company with other finches (J.E.R.). Only once seen at Blagdon this autumn—a single bird in November (J. Walby, per M.W.R.). On December 22nd at Seaton Sluice, two, ' the only birds I have seen this autumn and winter ' (C.A.B.). The only large flock reported was on October 10th on fields near the Carr Rocks, Warkworth, N., where, in a thick fog from 150 to 200 were counted. ' The golf-course, bents and fields were covered with Redwings, Fieldfares, Starlings, Goldcrests, etc., at the time ; but as soon as the fog lifted the whole lot disappeared ' (A.E.G.).

43. Corn-bunting.—Early song : On January 22nd three were heard singing in a hedge near Benton, N. (H.W.K.). Unusually numerous in S.E. Northumberland this winter. On December 22nd at Whitley Bay *c.* 40, at Earsden *c.* 20 (C.A.B.).

55. Reed-Bunting.—On June 26th at Gosforth Park, at least 11 singing cocks (J.A.M.). In mid-December between 300 and 350 birds were roosting nightly in the reed-beds round the lake (C.A.B.).

59. Snow-Bunting.—The large flocks which arrived in the autumn of 1948 (see *O.R.* 1948) remained throughout the winter. Between January 3rd and 8th there were still *c.* 200 on Holy Island (J.E.C.). On the 15th there were *c.* 60 on the beach near Amble, N. (F.G.G.) and on the coast near Newbiggin a flock of *c.* 100, with smaller flocks numbering in all *c.* 150 (D.M.R.C.). From January 3rd to February 18th a flock of from 6 to 12 birds were seen near South Shields pier (F.G.G. and J.C.C.). The last report was on March 19th when a flock of *c.* 50 was seen flying in a north-westerly direction across Newcastle Town Moor (C.A.B.). In the autumn of 1949 flocks were fewer and very much smaller. The earliest birds reported were on October 9th when 10 were seen at Alnmouth (H.T.). The largest flock recorded was one of 25 on December 22nd at the Tees mouth (D.S.). By the end of November they were well distributed on the moors in Upper Coquetdale and plentiful along the Borders (E.M.).

62. Tree-Sparrow.—Colonies have been found breeding at Black Heddon, Belsay, Prestwick Carr, Longhirst, Milbourne, Bolam and Meldon, N. (C.A.B.). In the gardens at Blagdon, N., a pair reared five young in a flower-pot (M.W.R.). Two or three pairs bred in the cliffs on the coast near South Shields, D. (J.C.C.). Several winter flocks were reported in December. The largest at Seaton Dene near Old Hartley, N., where on December 10th a flock of *c.* 350 to 400 birds was seen ; adding some smaller flocks nearby there must have been a grand total of some 600 birds (C.A.B.).

72. Shore-Lark.—Very few reported. On January 2nd at the Carr Rocks, Warkworth, a flock of 21 birds. Again, at the same place, from April 19th to 30th a flock dwindling from 11 to 3 birds (A.E.G.). The only other record was of a single bird seen on February 13th at Budle Bay with 18 Skylarks (F.B.). In the winter of 1949, one report only, a single bird seen on the shore near Beal, N., on December 11th (C.A.B.).

88. Yellow Wagtail.—Unusually plentiful this summer. On May 1st on the Tyne banks between Corbridge and Hexham many birds were reported. Some were doubtless residents, but others were noted to be flying up river as though on migration (H.T. and other members of N.H.S.). Breeding east of Haydon Bridge, on the South Tyne (W.J.). Several broods were successfully reared in the South Shields district (F.G.G. and H.M.S.B.). Small flocks regularly visit the Darlington Sewage-farm—May 9th *c.* 10, July 17th *c.* 20, August 26th *c.* 20 (A.B.). Also the Teesmouth marshes—August 20th *c.* 40, 24th *c.* 30, September 7th *c.* 20 (A.B.) On September 4th at Hell Kettles, Darlington, just before dusk a flock of at least 100 birds flew into the reeds (K.L.). On April 23rd one seen near Middleton-in-Teesdale—an early date. On the 26th, 10 or 12 in a flock (H.W.).

89. Grey Wagtail.—Nearly back to normal in the Alnwick district (J.E.R.).

Fairly numerous on the South Tyne about Haydon Bridge (W.J.). Seen in Jesmond Dene, Newcastle, November 5th, one (C.J.G.), December 5th, one (W.A.W.).

90. Pied Wagtail.—Reported to be more numerous than usual this year. Migrating flocks regularly visit the Darlington Sewage-farm—August 19th *c.* 25, 26th *c.* 20 (A.B.) ; also the Teesmouth marshes—August 20th *c.* 40, 24th about 30 (A.B.).

91. White Wagtail.—From April 12th onwards, on Holy Island, ' up to a score or more ' (R. Perry) ; on the 25th at the ' lough ' at least 11 (F.G.G.) ; on the 25th a flock of 22 with two Yellow Wagtails (R.H.). In the Berwick area from April 18th to May 8th from two to five birds seen on various occasions (F.B.). On April 22nd one at Hebburn Ponds, D. (J.C.C.). White Wagtails are not easily identified in autumn, but on September 7th at Teesmouth, on the marshes, a flock of eight was seen. The uniform pale grey of the crown, nape and rump, without black on the head, characteristic of the female and young male of this species, was clearly noted (A.B.).

96. Nuthatch.—On April 6th on the Banks, Durham City, a pair was seen carrying building material into a hole in an old tree (H.R.O.). Later a pair was seen several times feeding a single young one (J.L.C.). One bird still present in October (J.L.C.). On March 5th in Brancepeth Park, D., one, if not two, with Great Tits (J.L.C.). On August 22nd in Gosforth Park Bird Sanctuary, a single bird with *c.* 40 Great Tits (C.A.B.) and on September 10th and 12th a bird heard and seen near Kenton Lodge, Gosforth (C.A.B.). Bred again near Middleton-in-Teesdale in same elm tree and another pair in a new site (H.W.).

98-100. Tits.—The newly-acquired habit of entering dwelling houses to tear up paper has been recorded from many parts of the country. J.L.C. writes from Durham City : ' About a month ago (October) a bird, presumably a Tit, attacked some post-cards on the mantelshelf in my sitting-room. About a fortnight ago, within the space of seven days, I caught a Great Tit in my bedroom and a Blue Tit in my sitting-room ; a Blue Tit was caught in the Zoology Department and I found another in the Science Laboratories Library.' It is reported from Corbridge that Tits, said to be Blue Tits, are attacking clothes hanging outside to dry. (per H.R.O.).

100. Blue Tit.—' This autumn a new pane of glass was put into our kitchen window. A fortnight later we put up a bird-table with food outside the window. Soon afterwards it was noticed that the putty round the new pane was being attacked and a Blue Tit was seen at work upon it. The bird appeared to be eating the putty. This might have been due to the putty resembling fat or the oil in it may have given it a meaty flavour.' (H.R.O. and W.E.O.). Retribution : On October 31st at Gosforth a Blue Tit was found drowned in a milk bottle (per M.G.R.).

A juvenile ringed at South Shields, D., on August 29th, 1949, was recovered two months later, October 30th, at Felton, N., 26 miles N.N.W. (J.C.C.).

108. Willow Tit.—The pair recorded as having bred in Ravensworth Park, D., last year, excavated a new hole in the same holly stump ; but the nest was destroyed by Woodpeckers after two eggs had been laid (A.R.H.). Seen in Gosforth Park all the year (J.A.M. and others). On May 29th, near Kirkley Hall, N., one seen carrying food (J.A.M.).

111. Long-tailed Tit.—A good recovery in numbers was reported during the year ; many family parties were noted in late summer and larger flocks during the winter (W.M.B., L.P.H., J.L.C., J.A.M., J.E.R., etc.).

119. Red-backed Shrike.—On May 3rd a pair was seen in some thorn bushes by the roadside between Broomley and Riding Mill, N. They were observed at close range from a car, which was pulled up for the purpose. They were not seen on subsequent visits to the spot. ' I remember, when a boy, observing a pair on several occasions at Minsteracres. I never found a nest, but saw their " larder " in an isolated thorn bush. I do not remember the month or year.' (G.A.C.). On September 16th one was seen on the Inner Farne (H.T.).

120. Waxwing.—During the winter of 1948-49 (see *O.R.* 1948), few birds were reported. The only records after the turn of the year were on February 6th when two flocks, numbering 13 and 17, were seen feeding on haws near the coast just north of Beal, N. (D.R.S.) and on March 17th and 18th, when single birds were seen in the town of Darlington (A.B.).

The winter of 1949-50 brought very large arrivals which rapidly spread over both counties. The first reported were two birds seen at Killingworth on November 8th (C.A.B.). On the 12th a single bird was seen on the Brownsman, Farne Islands (F.G.G.). By the 16th a flock of 14 was in their favourite resort at High Horse Close, near Rowland's Gill, in the Derwent Valley, and this flock increased to over 40 in early December (C.H.). On November 19th two or three score were seen in the Plantation at Berwick and about 30 along the riverside ; this flock remained in the neighbourhood for about a month (F.B.). On the 20th a flock of *c.* 25 was flushed from a small fir plantation in Kyloe Woods, N., at dusk, where they were probably roosting (F.B.). Thereafter records came in from all over the two counties and several birds were sent to the Hancock Museum which had been picked up dead under telegraph wires, etc. Some were reported close to Newcastle. On December 5th, four were seen feeding on haws near the National Insurance Offices at South Gosforth (Mrs. Ryle, per S.E.C.) and on the 23rd a flock of 20 was in Gosforth Park (C.A.B.). One of the largest flocks recorded was from gardens in Stocksfield, N., where from 35 to 40 birds spent at least seven weeks ; their chief food being the berries of cotoneasters. They frequently visited shrubs trained up the walls of the houses (G.W.T.). Many observers reported having seen Waxwings ' flycatching ' on the wing and F.B. noted them ' hovering ' to pull haws off the tips of twigs which were too slender to bear their weight, in spite of there being numerous berries in more accessible positions.

121. Spotted Flycatcher.—Very plentiful in the Alnwick area (J.E.R.) and elsewhere. ' One of a pair that nested on our house at Stocksfield was seen to obtain material for its nest from an old (1949) nest of a Song-Thrush ' (H.R.O.). From September 30th to October 3rd a single bird was seen in Westoe Village, South Shields—a late date (J.C.C.).

123. Pied Flycatcher.—Very plentiful in the Alnwick area (J.E.R.). More than usually plentiful in the Tyne valley (J.A.M.).

Between September 14th and 24th on Holy Island they were fairly numerous, some being seen or heard each day ; all females or in immature plumage and often very noisy (H.R.O.). In Westoe Village, South Shields, where they do not breed, one or two birds were seen on August 23rd and 26th and on September 8th (J.C.C.).

125. Red-breasted Flycatcher.—On September 20th, on the Brownsman, Farne Islands, one, a hen or immature cock (H.T., F.J.N., A.M.).

' On August 24th, in my garden at " The Grove," Humshaugh, N., my attention was caught by a chirping and short song with which I was unfamiliar. I saw a bird immediately above me, perched on an electric cable. I could clearly see the red marking on the throat against a very light-coloured breast. The bird flew in and out of an adjacent ash tree and then flew down to a low wall, thus allowing me to see it in detail from all angles. I have never seen such a bird before, so went through *Birds of Wayside and Woodland* and the bird is shown on Plate No. 30 in all detail exactly as I saw it. On the following day I saw it again in the same area ; but have looked for it again each day since without success.' (C. White).

127. Goldcrest.—Migration records :- Between September 14th and 24th on Holy Island, Goldcrests were fairly numerous, some being seen or heard nearly every day—wind mainly N., N.E., or E. On the 23rd, in a thick mist, at least four were seen on the dunes amongst marram grass, three actually on the bare sand. On the following day, with a change of wind to S.E., 10 or 12 were seen on the sycamores at the lough (H.R.O.). During the week or so following the 24th, Goldcrests seemed to be particularly numerous in the Tyne valley about Stocksfield (H.R.O.). On September 16th on the Inner Farne, one (H.T.) ; on the 20th on Brownsman, two (H.T., F.J.N., A.M.) ; on the 28th on Inner Farne, one (H.T., F.J.N., E.A.G.). On October 8th, three or four in Straight Lonnen, Holy Island (D.G.).

129. Chiffchaff.—Birds were reported as singing in a number of places, but no nests were found. Stocksfield (H.R.O. and W.E.O.), Blagdon (M.W.R.), Dipton Wood (W.M.B.), Corbridge (J.A.M.), Ravensworth Park, Team Valley (E.G.T. and A.R.H.), The Banks, Durham City (J.L.C.), Norton, Stockton-on-Tees (D.S.). On September 25th two were heard calling in the South Shields area, one in Westoe village and the other at Primrose, Jarrow (J.C.C.). A winter record : On December 29th near Alnwick, one was clearly identified at close range with binoculars ; the Chiffchaff breeds in Hulne Park and elsewhere near Alnwick

(J.E.R.). Between November 26th and December 4th a small warbler was seen on several occasions in Westoe village. It uttered no note ; but it was certainly a Chiffchaff ; of which sub-species could not be determined (J.C.C., H.M.S.B.).

135. Wood Warbler. Very plentiful this year. Six pairs were counted in one wood near Blagdon (M.W.R.). Throughout late April and in May four cocks were in full song in Gosforth Park and later eight pairs were counted (C.A.B.).

145. Grasshopper Warbler.—Unusually numerous near Kielder, North Tyne, in the young pine forests ; preferring thick groups of young trees, 6 to 8 ft. high (D.M.B.). On May 19th a bird was heard singing in Gosforth Park Sanctuary (C.A.B.). At dusk on the following day it was heard by another observer. It sang almost continuously for half an hour, some of the spells being of five minutes' duration (W.A.W.). It was not subsequently reported.

153. Sedge Warbler.—On June 26th at Gosforth Park, at least nine birds singing (J.A.M.).

162. Blackcap.—During the month of February a cock bird haunted a garden at Cresswell, N. It first attracted attention by its song. It came to the garden each morning at dawn over a period of 7 to 10 days (W.N.C.). On March 3rd a cock was seen in the Wansbeck valley near Morpeth (T.G.H.). As these places are but six miles apart, these records may refer to the same bird.

164. Lesser Whitethroat.—On April 12th one at Killingworth Mere—an early date (C.A.B.). On May 16th a bird was heard singing near Mitford and another was noted at Mitford Steads, in the Wansbeck valley. (C.A.B.) An uncommon and irregular visitor to Stocksfield, but one was seen and heard on May 27th, 29th, and June 5th ; but not subsequently (H.R.O.).

174. Mistle-Thrush.—More in evidence, but still very scarce about Alnwick (J.E.R.). Beginning slowly to repopulate its former haunts near Craster, N. ; one heard singing on Christmas Day (W.S.C.). Still very scarce in the Alnmouth district (H.T.). Still scarce in the Tyne valley (G.W.T.) and in the lower vale of Derwent (C.H.). Breeding pairs noted in and around Newcastle—Hancock Museum grounds, bred successfully (G.W.T.), Elmfield Road, Gosforth, Gosforth Park, Brighton Grove, near Fenham Barracks, Westmorland Road near Ryehill, Elswick Park, Jesmond Dene (C.A.B.). Jesmond Road, Brandling Park, etc. (H.R.O.).

178. Redwing.—Flocks during the winter of 1948-49 were less numerous and smaller than was normal before the severe winter of 1946-47. In the autumn of 1949, however, considerable flocks were reported over a wide area ; the largest arrivals being in mid-November.

On May 29th at 8-45 p.m. a Redwing was seen and heard singing in a tree near the river at Durham (J.L.C.).

184. Blackbird.—Unusually plentiful along the coast during migration periods and in autumn many seen to fly in off the sea. On May 26th a cock was seen feeding on the Inner Farne (R.D.S.). On October 25th and 26th after a gale, many were seen on hedgerows in the village, Holy Island—at least 60 (R.G.G.). On November 12th, on the Brownsman, Farne Islands, at least 50 of both sexes were seen. When flushed they crossed over to Staples Island, but whether they remained there or passed on could not be ascertained. On four previous winter visits to the Brownsman—December 5th, 1926, December 2nd, 1928, November 30th, 1930, and November 20th, 1932—Blackbirds were noted there (G.W.T.). On October 29th at Seaton Sluice, N., during a slight fog, 16 were seen flying in from the sea (R.F.L.). On October 28th, one was seen to fly ashore along South Shields pier ; on the 30th, 25 birds flew into Westoe village from the east and from a considerable height, and on the 31st three were seen to drop into the village coming from the sea (J.C.C.). On October 30th, at Marsden, single birds were seen to fly in from the sea, one alighted on the calm sea before contining its flight (F.G.G.).

An adult female, ringed at South Shields on August 27th, 1949, was recovered at Stranraer, Wigtonshire, on November 9th following—150 miles to the west, (J.C.C.). A bird ringed as an adult at Douglas, Isle of Man, on March 16th, 1947, was recovered at Middleton-in-Teesdale, D., on August 4th, 1948 (*B.B.*, XLII, p. 267).

187. Greenland Wheatear.—In the last few days of April on Holy Island, several seen, with numerous Common Wheatears for comparison (F.G.G.). On May 9th at Darlington Sewage-farm, three cocks, identified by larger size and rich

cinnamon colour of breast (A.B.). On April 15th a single bird was seen in a stubble field near Cleadon, D. From the detailed description given it was most probably of this form. New houses were being built on the field and the bird frequently perched upon walls, chimneys and scaffold-poles—a recognised habit of this form is high perching. This is an early date for this species (L.K.).

198. Stonechat.—Very scarce along the coast. On May 5th a nest was found in the Howick area with three eggs (M.W.R.). During September, October and November, single birds and occasionally a pair, were reported by various observers between Howick and Craster ; but whether these were the same birds or not is unknown (W.S.C., J.D.T., H.R.O.). At Alnmouth a pair was seen on March 22nd and April 28th. On June 14th a hen was seen feeding recently-fledged young which must have been bred in the neighbourhood. Two were seen on August 20th, three on the 21st, and two on November 5th, a single bird being observed up to the end of the year (H.T.). Near Seaton Sluice a cock was seen on February 13th and 27th (H.R.O.). A pair bred successfully in the South Shields area—' the only ones I have known for several years ' (F.G.G.). Near Cowpen Bewley, Teesmouth, a pair was seen on May 23rd (D.S.).

Inland.—On July 10th on the slopes of the Upper Breamish, N., two families were seen in one party (E.G.T.). On June 6th an adult male near Wooler, N. (R.C.). On July 16th, near Holywell Ponds, N., one immature (D.R.S.). In the Haltwhistle area and in S.W. Northumberland generally, none has been seen for four years past : formerly they were as common on the hills as the Wheatear (M.P.). Not a single pair seen in the Waskerley district, D., this year (R.M.).

201. Redstart.—Unusually plentiful in most districts. Very numerous at Blagdon (M.W.R.). Seen on migration on the Farnes—September 16th two Longstone, one Inner Farne (H.T.).

202. Black Redstart.—On January 12th a hen was observed on the Sandy Beach, Berwick-on-Tweed ; on February 27th it was still there (F.B.). On July 23rd and 25th, Oliver Hook, M.B.O.U., visited the Longstone, Farne Islands, and found a hen bird there on both occasions frequenting the bomb-damaged engine-house. Mr. Hook is quite familiar with both species of Redstart (F.I.O.R., 1949). On October 17th on Ness Point, Holy Island, one (C.A.B.). The hen bird which, for four consecutive years, spent a few days on the cliffs at Manhaven, South Shields, in the early part of each year, did not put in an appearance in 1949 (J.R.C.).

205. Red-spotted Bluethroat.—On May 17th on Holy Island, one, in first plumage, almost certainly of this species (R. Perry).

207-208. Robin (sub-species ?).—On the Farnes. September 16th, Inner Farne, one ; 20th, Brownsman, one ; 28th, Inner Farne, one (H.T. and others).

218. Dipper.—Rather more reported than last year, but numbers still much below normal. More frequently seen in the Upper Coquet and North Tyne valleys (D.M.B.). Nearly back to normal numbers in the Alnwick area (J.E.R.). In fair numbers on South Tyne near Haydon Bridge (W.J.). The Dipper is known to be an early breeder ; but the following note, now nearly twelve years old, is well worth recording : On January 27th, 1938, on the Cottonshope Burn, Redesdale, two nests were found each containing five eggs (E.G.T.).

220. Swallow.—Two pairs nested and reared three broods in an old house in Westoe village in the middle of South Shields, D. (J.C.C.). Late records : One flying along the coast at Marsden on October 30th (F.G.G.) and one at Craster on November 1st (J.M.C.).

222. House Martin.—Not more than three pairs breeding on the cliffs at Cullernose this season (H.R.O.). This species does not breed in Durham City ; but early in August a party of *c.* 20 frequented the Prebend's Bridge for several days and again on November 5th, a late date, a party of 10 was circling round the Science Laboratories at Durham for at least 15 minutes (J.L.C.). Many remained late into the autumn—on November 5th two circling over farm buildings at Craster, N. (W.S.C.) ; on the 13th one seen at Haydon Bridge (W.J.) ; and on December 2nd one at Bamburgh (A. Williams, per H.T.).

223. Sand-Martin.—On July 11th birds were seen visiting nesting holes in the I.C.I. chalk-waste mounds at Prudhoe, N. The holes, 15 to 20 in number, were about 4 ft. from ground level just below the grass covering (H.R.O.).

234. Kingfisher.—Rather more reported this year, but still scarce on most rivers and streams. On December 27th one was seen to fly out to the wreck stranded on the rocks at Alnmouth (H.T.).

237. Greater Spotted Woodpecker.—On July 7th a pair at Rothley Crag, N., and another at Skirlnaked, Cheviot (W.J.). In Gosforth Park seven pairs were counted and the nesting holes of three of them located (C.A.B.). On migration : On September 14th in the Sandham Lonnin, Holy Island, one drumming frequently (R.D.S.). Between September 14th and 24th on Holy Island two or three were seen daily, perhaps the same birds, as all of them appeared to be immature. One was shot by an islander—' because he did not know what it was ' —but it was not critically examined to determine its sub-species (H.R.O.). On September 20th on Inner Farne, one, immature (H.T., F.J.N., A.M.). ' This bird had a very heavy looking bill and I have very little doubt that it was a Northern bird ' (H.T.). On September 22nd a bird was seen in Westoe Village, South Shields, and another at Cleadon, Sunderland (J.C.C.), while on November 5th another was seen in South Shields (L.K.). Considering the dates and the unusual situations these birds may have been on migration and it is possible that they were of the Northern form.

238. Lesser Spotted Woodpecker.—During three or four weeks in April and early May a bird of this species was seen on at least three occasions at Carrycoats Hall, Birtley, Hexham. It haunted some beeches and sycamores near the Hall. Its small size and the very pronounced bars on its plumage were its distinguishing features (R.S.B.). On October 24th, at Gosforth Park, one was seen at close range and definitely identified (F.G.G.).

249. Little Owl.—Still spreading. On August 3rd a bird was watched for some time on a stone in the centre of a large rabbit warren on Clennell Hill, near Alwinton (R.C.).

250. Long-eared Owl.—A pair bred again in Gosforth Park and reared three young. The eggs were laid in an old Carrion Crow's nest, 25 ft. up in a medium sized oak (C.A.B.). Between September 21st and 24th, on Holy Island, one or two were flushed with Tawny Owls out of the old hawthorns in the centre of the Island (H.R.O.).

251. Short-eared Owl.—More reports than usual. A pair reared three young on the moors in the Derwent valley. The hen gave good displays of injury feigning when the nest was visited (E.G.T. and A.R.H.). At the end of April six birds were seen in the aforested area around Kielder, N. They were frequently seen to perch on trees (D.M.B.).

253. Tawny Owl.—On April 17th at Edmundbyers, D., a bird, surprised on its nest in a hole in an oak only 3 ft. from the ground, feigned death (E.G.T. and A.R.H.).

254. White-breasted Barn Owl.—Bred again in Durham Cathedral. Three young were reared. The young were first heard on June 16th (J.L.C.).

259. Peregrine Falcon.—Cheviot site : A pair was seen haunting this site on April 9th. They were harrying a pair of Ravens which had a nest in the crags (W.K.L.). On June 22nd the tiercel was seen, but no nesting site was located (R.G.G.). Simonside site : On April 10th and May 1st a pair was seen at this site. The site was visited subsequently by other observers, but no proof of breeding was obtained (B.P.H., M.W.R., E.G.T., A.R.H.). A single bird remained on the Waskerley moors throughout the autumn and was still there at the end of the year, roosting on a crag on the Waskerley beck (R.M.). No Peregrines have bred on the Durham side of the Tees at Falcon Clints since 1934 (H.W.).

265. Red-footed Falcon.—On October 16th two adult males were seen on Holy Island, flying in from the N.E. over the links. They flew within 15 yards of the observer, one settling on a low wall some 20 yards aways. The head, back, wings and tail were very dark slate grey, the rump, flanks and breast being a little lighter, as were the primaries. The under tail-coverts were hidden from view, but the red on the beak and eyes could be plainly made out. Their flight was very similar to that of a Kestrel, but in size they were noticeably smaller. Seen in flight the birds appeared to be identical. They left in a S.S.W. direction (C.A.B.).

On October 30th on the links south of Seaton Carew, D., an adult female was seen at close quarters in brilliant sunshine. Its small size and orange-red legs first attracted attention. Its brown colouring, rufus underparts, chestnut flanks and tibial feathers and its darkly barred tail were all clearly noted (C.G. and D.B.).

269. Common Buzzard.—More reported than usual. In some instances when birds were seen in autumn and winter it was not possible to determine the species ; but the following were doubtless Common Buzzards. On April 15th, between

Otterburn and Alwinton, N., one (H.W.K.). On July 17th, on the Ottercops, N., a pair seen in flight, adult birds (H.M.S.B.). On September 22nd, at Quickening Cote, Coquetdale, one (E.M.). On August 18th, one on the Blanchland-Edmundbyers Road (L.G.H.). On October 4th, one on the moors at Belmont, south of Blanchland (B. Sadler). On November 12th, an adult female was killed by a rabbit-catcher in Hexhamshire. It had been feeding on a snared rabbit and its leg had become entangled in the wire. It weighed 2 lb. 11 oz. and had a wing-span of 47 inches (G.H.). During four weeks of late September and early October a Common Buzzard remained in Lambton Park (J.W.).

Buzzard (sp. ?).—On October 7th at 9 a.m. a Buzzard was seen to fly in from the sea near Craster ; from the date and the fact that the bird was crossing the sea, it was most probably a Rough-legged Buzzard (J.M.C.).

272. Montagu's Harrier.—Only one nest was located on the West Durham moors this season. The cock bird was first seen on May 1st. Three young were successfully reared and were ringed (G.H., E.G.T., A.R.H., M.W.R.). A cock bird was noticed to be haunting one of the sites that had been occupied in the previous year, but it has no mate (E.G.T., A.R.H.). Single birds have been reported from other parts of the County but no nests were found.

277. Sparrow-Hawk.—On August 17th near Darlington Sewage-farm a female was seen to drop down off a tree into a flock of seven Green Sandpipers which were feeding on a muddy spit in the River Skerne. The Sandpipers scattered, one submerged with such a splash that the Hawk sheared off in confusion. The Sandpiper then swam ashore, shook itself and flew off (A.B.).

284. Osprey.—On May 15th one was seen over Holy Island Harbour, northward bound (R. Perry).

On May 19th an adult female was picked up alive, but in a dying condition on the banks of the Coquet near Guyzance, N. On the same day an adult male was picked up in a distressed state on the shores of Coldingham Lough, Berwickshire. Both birds were sent to the Hancock Museum. The first died before despatch, the second lived for a week in a sickly condition, allowing itself to be handled without protest. Neither bird bore trace of damage by shot or otherwise. Poisoning or disease were suspected ; but expert postmortem examination revealed no proof of either. After death the weights of the birds were : female 2 lb. 12 oz., male 1 lb. 15 oz. The fact that the birds were picked up within some 45 miles of one another and were in the same physical condition points to some common cause of death.

On October 16th between 8-0 and 8-30 a.m. an Osprey visited Gosforth Park Bird Sanctuary. It flew back and forward over the lake, mobbed by gulls. It was seen to capture a fish of about half to three-quarters of a pound weight with which it flew off in a N.E. direction (R.G.G.). This bird was seen again later in the day by other observers who also saw it capture a fish (H.W.K. and D.G.). On December 23rd the decomposing remains of an Osprey were found in the reeds at Gosforth Park lake. This may have been the bird seen in the Park on October 16th (C.A.B.).

On October 17th an adult female Osprey was seen at Seaham Harbour, D. It was shot at, wounded, and finally killed. Its battered body was sent to the Museum. It weighed 3 lb. 2 oz.

289. Common Heron.—Northumberland Heronries : Longridge, near Berwick (not previously reported), seven nests with young (F.B.). Chillingham, eleven occupied nests (Lord Tankerville). Near East Bolton, Alnwick, in Boundary Wood Broom Park, three nests, eggs destroyed (E.M.). Shipley Moor, no nests (H.T.). Catcleugh, Redesdale, a few breeding pairs in a small fir plantation near north end of reservoir, nests not counted (T.F.H.). Blagdon Estate, none this year (M.W.R.). Gilsland, two pairs bred in tall beeches north of Gilsland (this may be just outside our area) (M.P.). Allen Banks, Bardon Mill, three nests, only two certainly occupied (J.C.C.). Grey Court, Tyne Valley (from Styford), six nests : birds only arrived on May 1st (T.F.H.). Riding Mill, near station, two nests, one brood successfully reared (per C.J.G.). Durham Heronries : Dyance Wood, Gainford, Tees Valley, nine occupied nests (R.O.V.). Whitworth Park, Spennymoor, none this year (C.G.).

297. Bittern.—On July 22nd at Billingham Pond, one. ' This bird got up out of some long grass and thick privet some 10 yards from me and I had very good views of brown striated plumage, green legs and stout neck ; also its characteristic

appearance as it circled the pond once and flew away towards the Tees marshes ' (D.S.). On September 15th at Gosforth Park lake a bird was heard calling repeatedly from the reeds. It was seen standing in a rigid position on a flattened portion of the reed-bed. Its head and most of its body were visible for over two minutes (C.A.B.).

300. Whooper Swan.—Remained late into the spring of 1949. On April 23rd still one at Hallington (E.M.L. and R.T.G.) and two at Hartburn Grange lake (M.G.R.). More numerous in the autumn of 1949 than in the previous year. On November 20th, 100-110 near Holy Island (R.H.). On November 6th and 13th at Grindon Lough, 47 (J.A.M., E.M.L.,) During November and December a flock of from 9 to 11 wintered on Holywell Ponds, N. (R.D.S., D.G. and others).

301. Bewick's Swan.—The only reliable record was of one seen on Greenlee Lough, N., with a party of 16 Whoopers on April 3rd (J.A.M.).

302. Mute Swan.—Numbers still increasing. From mid-November *c.* 150 near Berwick ; mainly adults, *c.* 20 first winter and a few second winter birds (F.B.). Large numbers on Budle Bay ; March 25th, 85 (H.T.). Very numerous on the Bardon Mill Loughs—April 3rd, 42 ; October 23rd, 45 (J.A.M.).

303-307. ' Grey Geese.'—The identification of ' Grey ' Geese is not easy, as the following instance shows. A flock of about nine birds spent the summer in the Holy Island area. They were never properly identified and may have been ' strays ' from a farm or ornamental water. First reported on June 6th as White-fronts, later, in July, as Grey-Lags (R. Perry). On July 9th they were seen near the Blue Caps, Farne Islands (F.I.O.R.). On September 11th, eight of them were seen on Goswick Sand-rig (J.C.C.). On September 24th, eight were seen on the shore north of Beal Point ; they walked into the water when disturbed and swam away. In all particulars they resembled Grey-Lags, but may have been domestically reared (H.R.O.). To judge by the number of reports of skeins of ' grey ' geese seen in flight over both counties there must have been an unusual number present in the autumn and winter.

303. Grey Lag-Goose.—On October 23rd at Holborn Moss, N., 46, and on November 20th, 207, in a flock flying in to roost (F.B.). On October 23rd on Holy Island, 16, and on November 20th, 70-75 (R.H.).

307. Pink-Footed Goose.—On March 20th at Whitburn, D., a flock of 120 (J.R.C.). At Holy Island on October 5th, 30-40 ; 23rd, 70-75 ; November 20th, 300-350, still there on December 18th (R.H.). At Teesmouth on November 19th a party of six seen at close range and definitely identified (K.L.).

311. Barnacle Goose.—On September 7th a flock of 14 birds visited Tunstall Reservoir, D., where it remained for three days. ' This is the first time that I have seen a goose of any species on any of these reservoirs ' (R.M.). From October 13th to 16th, one at Alnmouth (H.T.).

312-313. Brent Goose.—Very few indeed during the winter of 1948-49. Largest number reported was *c.* 30 near Holy Island in early January (M.W.R.). In the winter of 1949, up to the end of the year, very few reported.

[314. Canada Goose.—On March 5th on Capheaton Lake, N., a single bird, very tame, probably a stray from captivity. In early October a single bird spent several days on the Tyne at Corbridge (T.F.H. and others). On April 1st one on the Long Nanny at Beadnell (J.S.A.)]

315. Sheld-Duck.—On Holy Island few, if any, ducklings were reared. Foxes were blamed for this ; but a good many adults were caught in rabbit traps, which were down during most of the summer (R. Perry). Did not breed successfully at Alnmouth this year (H.T.). On October 1st on Gosforth Park Lake a flock of ten birds in first plumage (R.G.G.).

317. Mallard.—The largest number seen on Gosforth Lake was on February 7th when *c.* 1,000 were present.

318. Gadwall.—On January 18th a drake on Killingworth Mere, N., and on the 29th four birds on Gosforth Park Lake (C.A.B.). On February 6th on Waskerley Reservoir, D., eight (R.M.). On April 17th and 18th on Holy Island a pair (J.E.C. and J.A.M.). At Gosforth Park on August 21st, three (J.A.M.) ; on September 9th, four ; 16th, eight ; October 14th, one (C.A.B.). At Bolam Lake on October 28th, one drake (L.G.H.).

322. Garganey.—On the pond in N.E. Durham, where a pair bred successfully in 1947 and attempted to breed in 1948, a pair was again present during the nesting season of 1949. A drake was first seen on April 4th ; on the 16th three

drakes and two ducks were present, and thereafter two pairs were seen frequently up to the end of June ; but no young were ever seen (F.G.G.). A pair was present in Cowpen Marsh, Teesmouth, as late as May 22nd (A.B.). On April 15th on Gosforth Park Lake there were two drakes and a duck (D.R.S.). On marshes near Forest Hall two pairs were seen on April 15th and again in May (D.M.B. and M.G.R.).

323. Wigeon.—On June 18th on a pond near Embleton, N., a pair of Wigeon was seen ; the duck was accompanied by seven young in down, which must have been bred in the vicinity (F.S.).

235. Pintail.—From January 23rd to March 24th a drake was present on Gosforth Park Lake (D.G., H.W.K., J.A.M., etc.). From February 19th to March 3rd a pair was present on Jarrow Slake, D. (J.C.C.). From mid-September to the end of the year, a few birds, never more than three together, were reported from Holy Island, Holywell Ponds, Gosforth Park, Jarrow Slake and Hurworth Burn Reservoir.

326. Shoveler.—On July 15th a duck with eight young in down was seen on Gosforth Park Lake ; these birds must have been bred in the immediate vicinity (C.A.B.) ; on the 24th there were 24 on the lake, 16 of them juveniles (K.N.G. and W.R.L.). Shoveler most numerous at Gosforth Park in October, maximum number 33 on the 21st (C.A.B.). On July 24th there were two immature birds on Holborn Moss, N. (F.B.).

328. Common Pochard.—On the pond in Co. Durham where Pochard have bred previously a nest containing eight eggs was found on June 4th (F.S.). On July 8th four drakes and a duck were seen, but no young (M.W.R. and J.S.A.). A pair remained on Seaton Burn Ponds till mid-June, but no evidence of breeding (M.W.R. and C.A.B.).

330. Tufted Duck.—On the brick-field pond in Co. Durham 10 broods of young were reared (J.R.C.) ; on July 24th 67 birds were counted, 52 of them being juveniles (J.E.C.). Bred at Capheaton Lake, N., where on July 24th a brood of three was seen (H.W.K.). On July 2nd at Hallington, N., at least three ducks with young, one with nine, the other with seven.

334. Long-tailed Duck.—Very few reported off the coast in the winter of 1948-49 and up to the end of 1949.

337. Common Eider.—At least 210 ducks nested on the Inner Farne, not counting those concealed in nettle beds, three on Knoxes Reef, seven on Staples, 100-115 on Brownsman, and 50 on the Longstone group. Total between 370 and 385, as compared with 335 in 1947, the year of the last accurate count (*F.I.O.R*). Two pairs bred successfully near Dunstanborough Castle (F.G.). On Coquet Island there were about 60 to 70 nests. ' On July 1st I counted 57 ducklings in the River Coquet, off Hauxley and on Coquet Island. Crows and gulls were destructive, but human interference was nil.' (A.E.G.). A few pairs breed, or attempt to do so, on the Emblestone off Embleton, N. In 1947 six nests were seen with eggs ; in 1948 seven nests had eggs (D.W.). In 1949 one nest was found with broken egg-shells (R.C.). At Seahouses a cream-coloured uck dwas seen on April 24th and again on May 14th, but not subsequently (H.T.).

340. Velvet Scoter.—Few recorded in the early part of the year. The unusually large numbers reported in the autumn of 1948 (see *O.R.*, 1948) did not remain throughout the winter (H.R.O.). There were again one or two summer records : On July 17th, off Marsden, D., at least two flying north in a flock of *c.* 70 Common Scoters (F.G.G.). On July 19th in Hartlepool Bay, D., three seen (D.S.). At Alnmouth on September 12th, two drakes, and on November 12th nine drakes, were seen flying north (H.T.).

342. Goosander.—Early in June a nest containing nine eggs was found in a hollow tree on the Swarland Burn, a tributary of the Coquet, N. The nesting hole was about 8 ft. from the ground in an old ash tree. ' The amazing thing was the speed with which the female entered the nesting hole, alighting at the edge and disappearing in the twinkling of an eye. She was rather a timid bird and flew out when she heard anyone near the tree. That was how the nest was found. I was able to secure a photograph showing the bird perched at the hole.' (J.E.R.). A Goosander nested in a hollow ash tree in the Usway Valley, N. (per E.M.). Three pairs were seen in the Coquet valley during the breeding season, probably nesting (E.G.T.). Reported to have bred for the last three years in the Kielder district of North Tyne (D.M.B.). On July 4th near Countess Park on the North

Tyne an adult female, accompanied by two young of the year, was seen. When approached, the young flew away and the female feigned injury. Later they were seen again under very favourable conditions (K.I.). No nests have yet been found in the Haltwhistle area, though birds are frequently seen there (M.P.). Very numerous in winter on the loughs and rivers.

344. Smew.—From November 20th to the end of the year a female, or immature male, remained on the Whittle Dene Reservoirs (W.A.W.). Mature drakes are not often seen, but on November 20th one was seen between Newton Point and Dunstanborough (F.G.).

346. Cormorant.—The Megstone, Farnes, colony was large ; estimated between 200 and 300 nests, but no accurate count was possible. On May 5th there were about 100 nests on the North Wamses, most of them with eggs, but by the beginning of June they had all been deserted (*F.I.O.R.*).

Recoveries : A bird ringed on the Farnes on July 19th, 1939, was recovered at Berwick ten years later, in April, 1949 (*B.B.*, XLII, p. 271.). Three more birds, ringed as nestlings on the Megstone on July 23rd, 1948, have been recovered, all at Berwick—dates : December 23rd, 1948, March 5th and 11th, 1949. (See *O.R.*, 1948, for previous recoveries.)

348. Shag.—At least 64 pairs bred on the Farne Islands. One sitting bird was seen to be wearing a ring which showed that it has been ringed as a nesting adult on June 16th, 1947. Two birds ringed as young on July 23rd, 1948, have been recovered—one on a lightship off the Frisian Islands on February 16th, 1949, and the other at Holt, Norfolk, on March 14th, 1949 (*F.I.O.R.*, 1949). Three pairs bred on the cliffs at Dunstanborough (F.G.).

349. Gannet.—On July 14th an immature bird was found dead on the Brownsman, Farnes, bearing a ring showing that it had been ringed as a nestling on the Bass Rock on July 10th, 1948 (*F.I.O.R.*, 1949).

350-351. Petrel (sp.?).—On June 27th at sea about two miles east of Coquet Island, a Storm or Fork-tailed Petrel was seen by G. Fawcus, fisherman, a reliable observer (per A.E.G.).

351. Leach's Fork-tailed Petrel.—On April 24th, 1949, a small black bird with a white rump and a noticeably forked tail was seen flying over the water of the River Tyne, opposite Ryton, D., and at least 15 miles from the sea. It was watched through glasses for some time by Frank Scott and Donald Wright. As it flew backwards and forwards it was seen to touch the water with its feet. Later it was shot by another boy and eventually it was shown to Mr. F. Bates, a master at Hookergate School, who definitely identified it as a Leach's Fork-tailed Petrel. Unfortunately, the bird was not preserved. Weather conditions at the time were quite normal and there was nothing to suggest that the bird had been driven inland by storm.

At first sight this seems an extraordinary occurrence, but on reference to previous records of this species it will be noted that of the very few birds reported from Northumberland and Durham in the past no less than three of them were obtained on the River Tyne, west of Newcastle. In November, 1828, one was shot near Benwell boathouse, at least 10 miles from the sea ; in 1830 one was killed opposite the Old Mansion House, just above the Tyne bridge and eight miles up the river ; on March 1st, 1886, one was shot on the Tyne at Swalwell, 11 miles from the sea. It is not recorded under what weather conditions these birds appeared. This seems to suggest that there may possibly be a flight line between the North Sea and the Irish Sea by way of the Tyne valley, crossing the Tyne Gap to the Eden and Solway ; but more evidence is required before this is proved to be so.

355. Manx Shearwater.—More reported than in previous years ; perhaps because more watchers are now on the lookout for them. The earliest reported were on April 26th, when small parties were seen flying north off Holy Island—two, six, three, three, and seven—total 21 (F.G.G.). On the same day, off St. Mary's Island, seven were seen flying north (J.C.C.). During June, July and early August small parties were seen flying north off the coasts of both counties. The most noteworthy records were reported from Bulmer, N., by H.T., where, on June 21st, 13 were seen flying north ; on July 2nd *c.* 20 were apparently feeding on the surface with gulls, guillemots, etc., while a further 12 or so flew north. On the following day at least 12 were apparently feeding. The last seen off Bulmer was on August 4th (H.T.) ; but the final record was on August 5th, when two birds were seen flying north off Seaton Sluice, N. (F.G.G.).

368. Fulmar Petrel.—Possible new breeding sites : In mid-June Fulmars were seen on the moorlands on the Belford-Fowberry road, quite six miles from the open sea. They were flying across the face of the crags and sitting on the ledges, but no eggs or young were seen (per V.D.). A pair was haunting the Priory cliffs at Tynemouth, but breeding has not been proved (W.N.G.).

On the Inner Farne seven eggs were laid, but all were lost (*F.I.O.R.*). Marsden Colony : Numbers quite up to usual. 42 young were kept under observation ; the first to leave the ledges was on August 28th ; by September 7th the majority were in flight and by the 10th none was left (F.G.G.).

370. Great Crested Grebe.—A pair spent most of the summer on Hallington reservoir, but no nest was found nor young seen (E.M.L., R.T.G., H.R.O.). Single birds were seen on other waters.

373. Slavonian Grebe.—As usual there were many records of single birds seen on the coast in autumn and winter ; but on October 9th in the Coquet at Amble, N., no less than 14 were seen together (A.E.G.).

374. Black-necked Grebe.—On the pond in Co. Durham, where a pair bred in previous years, not more than one bird was seen this season. It was last seen on July 24th (J.L.C.). On July 24th on Hurworth Burn reservoir, four birds were identified—two of them being juveniles. It is not likely that they had been bred there (P.L.H.).

381. Stock-Dove.—In an old building near Waskerley, D., a pair nested five times this year and reared 10 young, all of which were ringed (R.M.).

383. Turtle Dove.—No breeding yet proved in South Northumberland or Durham. From May 22nd to June 23rd a single bird was frequently heard and seen in a Stocksfield garden. No mate or nesting site was discovered (W.E.O. and H.R.O.). A single bird was frequently seen and heard in Lambton Park, D., but no second bird was seen. It remained until September 9th (C.E.T.).

387. Black-tailed Godwit.—Between April 15th and May 8th birds were reported on eight occasions, either inland or on the coast. On April 23rd and 24th one was seen at Grindon Lough, where they have so often appeared before (A.H.E. and J.R.C.). The largest number was a flock of ten on April 26th at Potland Pond, near Ashington (R.C.). Two or three were recorded in autumn, all on the coast.

393. Woodcock.—J.W. writes from Pictree, D. : ' On May 25th I flushed a pair of Woodcock which got up six yards away from me. One of them was carrying a chick. She carried it for 50 yards, then 15, then about 20 yards up a hillside into some firs. She flew slowly for a Woodcock and I ran after her. When she rose for the second time I got a side view from three yards away and I saw the chick held between the legs of the adult which embraced the chick's body below the wings. I have seen this action three times before, but never at so close a range.' On April 21st a similar incident was observed near Middleton-in-Teesdale (H.W.).

400. Grey Phalarope.—On October 30th from South Shields pier, four very small birds were observed swimming in the harbour at about 20 yards distance. They were described as being about the size of a thrush, grey like gulls, with white heads. They took off with a sustained high whistle and flew very swiftly over the water with rapid wing-beats. From the description given me these can only have been Grey Phalaropes (F.G.G.).

404. Southern Dunlin.—On a site in the Rothbury area four pairs were seen on May 1st and breeding was suspected : on the 30th two young were found and on June 3rd a nest with three eggs (M.W.R.). At the loughs, adults in breeding plumage have regularly been seen in spring and summer. It is long since nests were seen there ; but in late May this year a nest of eggs was found (M.P.). Bred again on Upper Teesdale moors (H.W.).

406. Curlew-Sandpiper.—For the third consecutive year very few were reported, usually single birds. Only once seen at Alnmouth—a single bird on September 3rd (H.T.).

407. Little Stint.—Not more than half a dozen records, usually of single birds. Largest number six on April 23rd south of Hartlepool (H.R.).

417. Ruff.—Single birds were seen at Killingworth Mere on August 16th, September 13th, 14th and 15th (D.G., M.G.R.). On the Teesmouth marshes on August 14th, six, and 20th, four (A.B.). Throughout August in the South Shields district, at Primrose and Whiteleas, single birds, usually immature, were seen ; largest number, three (F.G.G.). At Alnmouth one was seen on August 12th and a single female as late as October 28th to 30th (H.T.).

421. Common Sandpiper.—On migration : September 3rd, Holy Island, one ; 11th, Berwick, one ; 17th, Beal, one (F.B.) ; 28th, Inner Farne, one (H.T., E.A.G.).

424. Green Sandpiper.—Few recorded on the spring passage. In March, one was seen at Primrose Pond, Jarrow, and another near Matfen, N. (J.R.C.). More than usual reported on passage in the autumn. On the Wear, in Lambton Park, birds were seen regularly between August 16th and 31st, generally in company with Common Sandpipers, largest number present at one time, three. None seen here in previous year. (C.E.T.).

432. Greenshank.—Seldom reported on spring passage ; but one seen on Budle Bay on April 14th (F.G.G.). More than usual reported from the coast in autumn and four records from inland waters (W.H.K., M.G.R., D.G.).

435. Ringed Plover.—On the much-frequented beach between South Shields and Sunderland, two pairs laid eggs, but both clutches were taken (J.C.C.).

440. Southern Golden Plover.—On January 29th near Darden Lough, N., two pairs and one odd bird were already on their breeding ground at above 1,000 ft. An early date (R.G.G.).

444. Grey Plover.—More than usual reported in the spring. On April 17th *c.* 30 near Holy Island (J.A.M.) ; on the 25th at Holy Island 30 changing to breeding plumage ; on May 8th on Fenham Flats, N., *c.* 50, of which 30 were black-breasted (H.T. and F.B.).

449. Lapwing.—More reports of breeding than for some years past. On a four-acre field near Bardon Mill, N., 88 eggs were counted (per W.J.). On May 1st three young birds, attended by an adult, were seen on a shingle-bed on the Coquet. The adult flew off and two of the young ' froze ', the third took to the river, swam about eight yards up-stream and came safely ashore. These birds could not have been more than two days old (D.R.S.).

452. Oystercatcher.—' In South Northumberland previous to 1928 no Oystercatchers bred on the river shingles. Since that date they have steadily spread, until now they are common right up to the head-waters of most rivers and even up the tributary burns. Breeding pairs arrive on the gravels of both the North and South Tynes early in March. On one long gravel stretch I knew of five nests. One nest near Haltwhistle was on a ploughed field about 20 yards from the nearest water. The farmer found it with deeply incubated eggs early in May when he was preparing the land for turnips. He moved the eggs until he had sown the seed, then replaced them, and presently had the satisfaction of seeing the female return to her clutch. This brood was hatched off. Practically all the Oystercatchers breeding in the Haltwhistle area return *west* to the coast in family parties ; never have I seen any flying east.' (M.P.)

462. Black Tern.—A single bird was seen on the Longstone, Farnes, on May 3rd—the only record for the year (*F.I.O.R.*).

467. Sandwich Tern.—First seen on the Farnes April 4th ; first eggs laid May 18th ; first young hatched June 12th. Largest colony, 200 nests on the Longstone. Two pairs nested on the Inner Farne. Total number of nests on the Islands *c.* 370 compared with *c.* 410 in 1948 (*F.I.O.R.*).

468. Roseate Tern.—Rather more pairs on the Farnes than in 1948 and differently distributed. 23 nests were found altogether compared with 14 last year. One of the nestlings ringed on the Inner Farne on July 21st was found dead on the South Gare Lighthouse breakwater at Teesmouth on August 7th. (*F.I.O.R.*).

469. Common Tern.—More seen on Farnes than last year, but no nests were located on Inner Farne or Brownsman. A few nested with Arctics on Longstone group (*F.I.O.R.*). A pair attempted to breed at Alnmouth, but the eggs were laid below the spring tide level (H.T.). At Teesmouth on May 22nd, nine pairs were present, but no nests seen (A.B.).

470. Arctic Tern.—The usual large colonies on the Farnes did very well. Two birds, ringed as young on July 11th, were found dead before the end of the month ; one at Portobello, Midlothian, on the 24th, and the other at Aberdeen on the 31st (*F.I.O.R.*). On June 11th a small colony was visited on the mainland, when seven clutches of eggs were found (F.B. and G.W.T.). On July 20th both eggs and young were seen there (M.W.R. and J.S.A.).

471. Little Tern.—On June 11th a small colony, with Arctic Terns, was visited, when five clutches of eggs were found (F.B. and G.W.T.). On July 20th

both eggs and young were found, some of the latter on the wing (M.W.R. and J.S.A.). In May only about four pairs were seen at Teesmouth, and no reports of breeding have been received (R.S.).

477. Little Gull.—On March 6th a single bird in summer plumage was seen, with Common Gulls for comparison, on Killingworth Mere, N. (C.A.B.). On November 6th at Seaton Sluice Harbour, N., an adult in a battered condition (C.A.B.).

482. Herring Gull.—Fewer pairs are now visiting the Farnes for breeding purposes than formerly (*F.I.O.R.*). Now breeding in some numbers on the summit of Marsden Rock, D. ; on May 19th 120 adults were counted perched on the top ; on the 29th the first young were seen and on July 9th 105 young were visible (F.G.G.). On November 20th an adult was seen flying over the sea with what appeared to be a large bread-crust. On two occasions it rose to *c.* 20 ft. and dropped the object into the water, diving after it as it sank and then attempting to swallow it. No doubt this was a variant of the habit of dropping molluscs on the rocks to break them open, in this instance quite futile (H.W.K.).

485. British Lesser Black-backed Gull.—A pair reared three young on the top of Marsden Rock, D., in the colony of Herring Gulls (F.G.G.). This is the first tecord of breeding on the Durham coast. It is possible that, before East Durham became so industrialised, Gulls of this species may have bred on the cliffs, but a thorough search of all the available records, published or otherwise, yields no proof of their ever having done so (G.W.T.). The breeding of a pair on the moors near Edmundbyers was recorded last year ; this year birds were seen in the same locality, but no nest was found (E.G.T. and A.R.H.).

487. Glaucous Gull.—Several of our members reported them from the coast in the early part of the year, all immature. Fewer reports in the autumn and winter.

489. Kittiwake.—A small breeding colony has established itself on the topmost window-ledges of a warehouse at North Shields, N. This building overlooks the vehicular ferry between North and South Shields and is nearly two miles up river from the pier heads. Five nests were built (W.N.G. and F.G.G.). The use of window-ledges was first noted at Dunbar, where a colony established itself on buildings overlooking the harbour some years ago.

Marsden Rock colony this year presented rather an incongruous appearance as so much straw was used in the construction of the nests. On May 3rd, 7th and 12th there was a continuous traffic of birds carrying straw from a field which had been heavily manured (F.G.G.).

Recoveries : A bird ringed as a nestling on the Farnes on July 23rd, 1948, was recovered on January 20th, 1949, at Juist, Frisian Islands, Germany. Another ringed in 1946 was recovered at Port aux Basques, Newfoundland, on November 26th, 1948 (*B.B.*, XLII, p. 275).

491. Great Skua.—In autumn a few, usually single birds, were seen off the coast : On July 11th and 14th single birds were noted near the Farnes (M.W.R. and J.S.A.). On August 4th two were seen flying north off Boulmer, N. (H.T.). On August 30th one was seen passing south at Whitburn, D. (F.G.G.). On September 11th, off Holy Island, two were seen flying south (J.C.C.).

492. Pomatorhine Skua.—On August 7th, off Holy Island, one, dark phase (R. Perry).

496. British Razorbill.—Seven pairs bred on the cliffs of Inner Farne and one pair on the Stack (*F.I.O.R.*, 1949).

499. Southern Guillemot.—One, ringed as young on the Megstone on July 23rd, 1948, was recovered at Lindesnes, Norway, on January 16th, 1949 (*B.B.*, XLII, p. 276).

501. Black Guillemot.—On July 6th, off the Inner Farne, one in summer plumage (N.M.K.). Others were observed passing the Longstone each day from July 7th to 14th (*F.I.O.R.*, 1949). These are the first summer records on the coast since 1933. Others were reported on the coast on September 17th, 18th, and 19th, and four on November 6th off Blyth (D.G.).

502. Little Auk.—On January 26th one, badly oiled, was washed ashore alive at Berwick (F.B.). During the winter others were reported : On December 11th an oiled bird was picked up dead at Whitley Bay. It had been observed off the coast in a disabled condition for a week or so (R.H.V.).

504. Corncrake.—More were reported from the Tyne Valley than for many years past ; at least 17 were located, but whether they bred successfully is not recorded. However, at Greenhead, N., a nest of nine eggs was found, all of which hatched out (M.P.). Two were reported from the Coquet valley and two near Alnwick. In Upper Teesdale at least two were heard and three or four young were seen in a meadow at mowing time (H.W.).

505. Spotted Crake.—On July 1st at Gosforth Park a single bird was seen on a muddy patch near the lake. It was observed at a distance of 30 yards with 8× glasses (C.A.B.). Again on December 3rd, at the same place, a single bird was seen swimming like a Moorhen with a party of Teal close to the reeds. After a few seconds it moved into the reeds out of sight. The characters noted were the greenish-brown upper-parts spotted and streaked with white, brownish neck and breast and short bill (C.A.B.). It will be remembered that on October 20th, 1947, a bird was seen at the same place by C.G. and D.B. (see *O.R.*, 1947).

513. Black Grouse.—More records from Northumberland than for several years past.

514. Red Grouse.—A very good season. On the west Durham moors broods of 9, 10 and even 12 young were successfully reared (R.M.).

519. Red-legged Partridge.—On September 26th two birds were noted on the Berwickshire border near Marshall Mains, about 100 yards from the coast (C.A.B.). In the autumn a single bird was shot out of a covey near Winston, D., by Captain Frank Bell, of Stubb House, Winston, D.

520. Quail.—On June 22nd one was heard calling from a hay-field near Fenton Mill in the Till valley (R.G.G.). On September 14th one was flushed from a field of roots, four miles north of Morpeth (H. Tegner in *The Field*). On September 24th one was flushed from a field by the River Derwent near Ebchester. In September of the previous year one had been flushed from the same field (J. N. Mewes in *The Field*). A pair bred on the Durham side of the Tees near Winston (per W.R.) and on August 28th a nest with five eggs was found on the Durham side of the Tees near Yarm (J.A.S.). On October 22nd, on the slopes of the Simonside hills near Thropton, a flock of about 20 birds was seen flying east. From their size, shape, colouring and musical triple call they were identified as Quail. Later they were seen again in a stubble field from which they rose on being flushed ' like miniature Partridges ' (N.F.).

Key to the Initials occurring in the above Report :

J. S. Ash, A. Baldridge, C. A. Barton, D. Bell (Miss), L. Bennett, H. M. S. Blair, D. M. Boll, F. Brady, W. M. Brady (Miss), R. S. Burn, J. E. Caffyn, A. J. Clissold, J. Common, G. A. Cowen, R. Cook, S. E. Cook, J. C. Coulson, W. N. Craigs (Mrs.), J. M. Craster, W. S. Craster, J. R. Crawford, D. M. R. Crombie, J. L. Crosby, V. Dobson (Miss), A. H. Emslie-Smith, M. Flanighan, N. Fletcher, C. J. Gent, D. Graham, A. E. Gregory, F. Gregory, K. N. Green, W. N. Greenwell, C. Greenwell (Miss), F. G. Grey, R. T. Grey (Miss), R. G. Grey, G. Hedley, R. Henderson, B. P. Hill, L. P. Hird, T. F. Hird, P. L. Hogg, L. G. Holloway, T. G. Hoskin, A. R. Huntley, C. Hutchinson, K. Ilderton (Rev.), W. Johnson, N. M. Kennaby (Rev.), H. W. Kerridge, L. Kinlen, E. M. Lobley (Miss), W. R. Lofthouse, K. Longstaff, C. H. Longstaff, R. F. Lyndon, A. MacRae, J. A. McGeoch, R. Martinson, E. Miller, F. J. Nattrass, H. R. Oliver, W. E. Oliver (Mrs.), R. Perry, M. Philipson, M. W. Ridley, W. Ritson, M. G. Robinson, H. Rowell, J. E. Ruxton, B. Sadler, F. Scott, D. Seaward, D. R. Shannon, J. A. Sweetlove, H. S. Tegner, H. R. Temperley, G. W. Temperley, J. D. Thompson, H. Tully, C. E. Turner, E. G. Tyer, R. O. Varley, R. H. Viall, J. Walby, T. G. Wallace, J. Walton, H. Watson, G. Watt (Miss), C. White, D. Wright, W. A. Wright.

Correction.—In Messrs. Reynolds and Taylor's paper on the Algae of Swithland Reservoir, Leicestershire, *Naturalist*, April-June, 1950, p. 53, line 42, under *Volvox globator*, for 'Zoospores ' read ' Oospores.'

FIELD NOTES AND RECORDS

' Red Rain ' in Leeds.—A spell of dry weather in June, 1949, was broken by heavy showers. A few days afterwards (14th) the rainwater from a greenhouse collected in a galvanized iron tank at Chapel Allerton, Leeds, had become dull green in colour. On examination under the microscope, the water was found to contain large numbers of a motile unicellular alga with two flagella. Some of the cells had a bright red pigment (haematochrome) near the centre. A week later the surface of the water in the tank was covered with a blood-red scum. The colour was due to the haematochrome which had increased and nearly filled the algal cells.

A specimen of the alga was sent to Dr. J. W. G. Lund at Wray Castle and I am indebted to him for determining the alga as belonging to the genus *Sphaerella*. In his letter he said he had never had a sample of ' red rain ' but it would appear that the records refer in the main to this alga. He kindly sent me a culture he had made from the material sent which showed clearly protoplasmic threads extending outwards to the cell-wall, a characteristic of the genus *Sphaerella*.

West and Fritsch, *Treatise on British Freshwater Algae* (1932), state that *S. lacustris* (Girod.) Wittr. is common all over the country and ' red rain ' is sometimes due to this alga.—H. Whitehead.

Polyzoan Colonies in Hornsea Mere.—In September, 1947, the water level of Hornsea Mere was exceptionally low and there were large numbers of Polyzoan colonies exposed along its shoreline, especially on the south-east side. These have been identified by Dr. A. B. Hastings of the British Museum (Natural History) as *Plumatella fungosa* (Pallas). They were a remarkable sight, as shown in the accompanying photograph, and my father who has lived in Hornsea all his life could not recollect having seen them like this before.

The colonies still under water were mostly alive and round in shape with a flat base. In the centre of the base there was usually a small stone or other solid object, to which the young colony had presumably become attached. The commonest size was 3″-5″ diameter, and the largest seen were an ellipse-shaped colony of 7″ × 5½″ and a circular one of diameter 6¼″. These larger specimens were usually covering a big *Anodon* choked by the growth round it of the Polyzoan.—P. F. Holmes.

***Gyromitra esculenta* (Pers.) Fr. at Salterhebble.**—In 1897, H. T. Soppitt reported to C. Crossland that he had found the brain fungus at Salterhebble, near Halifax, and the latter visited the site until his death. After 53 years the fungus continues to appear each spring, but for the last few years it has been confined to a smaller area, yielding about half a dozen spore heads, some very small. This year they are of good size. The bank on which it grows has been invaded by Sweet Cicely and the Butterbur is decreasing.—H. Walsh.

***Bryum atropurpureum* W. & M., var. *gracilentum* Tayl.** This moss, so far recorded from V.C. 62 and 63, grows on the stone overflow from the old mill dam at Tong Park, near Baildon V.C. 64. The variety, which Mr. J. B. Duncan says probably never fruits, appears to prefer wetter situations than the type.—J. Appleyard.

***Calypogeia Meylanii* Buch. in Yorkshire.** With reference to my note published in *The Naturalist*, 1949, 156, it has now been brought to my notice that this was not in fact the first record of this species for Yorkshire as it has already been recorded by E. C. Wallace in *Trans. Brit. Bryol. Soc.*, 1, 3, 243, as follows : ' On the ground amongst grit rocks, ravine at Wath, Pateley Bridge, M.W. Yorks. (64), Oct. 1947, E.C.W.'—R. Lewis.

Old Record of Gannet nesting in Yorkshire.—The authors of *The Birds of Yorkshire* (1907), Vol. 2, pp. 381-4, were unaware of the nesting or attempted nesting of the Gannet (*Sula bassana*) in the county of Yorkshire. During my work on the reorganisation of the vast Rothschild collection of eggs at Tring Museum an egg passed through my hands which has some bearing on the subject. The egg, which is now national property and which is not yet registered, bears in very good writing the inscription ' 446a. Flamborough, Yorksh. Coll. Jos Blackburn. 1861 '. A label with the printed words ' Gannet Sula bassana, Boie ' is pasted over the hole. Flamborough Head appears to be the favoured haunt of the Gannet during its visits to the coast of Yorkshire.

The egg is a perfect specimen, but I can find no information regarding its history. The publication of this note and the handwriting on the egg might bring to light more of the story of an interesting Yorkshire specimen.

I do not overlook the nesting and attempted nesting at Bempton from 1924 onwards.—William E. Glegg.

Y.N.U. BRYOLOGISTS AT PATELEY BRIDGE

H. Walsh.

Four members of the section were fortunate on April 12th in having a fine day, after a few days of rain, for the visit to Pateley Bridge. On the way to Ravensgill —the only part investigated—the most conspicuous of the gritstone wall mosses were *Brachythecium populeum* and *Encalypta streptocarpa*. The latter was plentiful in places and as usual was without capsules. As gemmae are unknown it is rather a puzzle how it spreads. Ravensgill, a wooded steepish cleft in the hillside traversed by a feeding stream of the Nidd, is similar to the South-west Yorkshire cloughs and like them is part of the millstone grit.

Although not in an industrial area, the tree trunks were as bare of trunk mosses as in South-West Yorkshire where smoke is generally considered to be the lethal agent. This absence attracted the attention of members on a previous visit and is commented upon in *The Naturalist*, 1919, 309. The dominant moss is *Mnium hornum*, fruiting much more abundantly than at Hardcastle Crags and in comparison with the south-west one was glad to see the abundance of *Thuidium tamariscinum* at Ravensgill. One could traverse Hardcastle and other cloughs without seeing this attractive moss and we have no evidence of there ever having been much of it. There are records for two stations which were overlooked in compiling the Yorkshire list of 1945, but it does not appear to be in the Huddersfield area and it is surprising when one looks up the county records to find it so common in V.C. 64, but with two stations only—Roche Abbey and Snelgrove—in V.C. 63. Another ground moss, *Plagiothecium undulatum*, is plentiful both at Hardcastle and Ravensgill.

As expected, *Orthodontium gracile* var. *heterocarpum* is plentiful in this area. It was recorded for the first time in 1932 at Guy's Cliff. *Dicranoweisia cirrata* was collected with capsules in abundance and also another gathering with few capsules but with the stems bearing gemmae. The presence of the latter is not mentioned in Dixon's *Handbook of British Mosses*, but I have had two previous gatherings from Malham and Plompton Rocks. *Dicranum majus*, judged by the size of the plants, was more frequent than *D. scoparium*, but it was not seen fruiting.

As on the grit of the south-west, the most plentiful thalloid hepatic is *Pellia epiphylla* with occasional patches of *Conocephalum*. The dominant leafy hepatics were *Cephalozia bicuspidata*, *Lepidozia reptans* and *Diplophyllum albicans*. Many prostrate trees were bearing large patches of fruiting *Lophocolea cuspidata*, the black-headed capsules being very noticeable. A gathering of an intricate mixture of bryophytes well repaid careful separation of individual stems. Besides four common mosses and hepatics the mixture yielded *Lophozia incisa*, *Harpanthus scutatus*, *Sphenolobus exsectiformis* (two stems, each bearing gemmae), and *Scapania dentata*.

The following are full lists of plants collected by Mr. G. A. Shaw and myself. Species not previously recorded for Ravensgill are indicated by the sign *.

MOSSES

Tetraphis Browniana Grev. c.fr.
Catharinea undulata W. & M. c.fr.
Polytrichum formosum Hedw.
Diphyscium foliosum (L.) Mohr
Ditrichum homomallum Hampe c.fr.
**Seligeria recurvata* B. & S. c.fr.
Dicranella heteromalla B. & S. c.fr.
D. squarrosa Schp.
Blindia acuta B. & S.
**Campylopus fragilis* B. & S.
Dicranoweisia cirrata Lindb. c.fr.
Dicranum scoparium Hedw.
D. majus Turn.
D. fuscescens Turn.
Fissidens adiantoides Hedw.
F. taxifolius Hedw.
Grimmia apocarpa Hedw. c.fr. (Bewerley)
Rhacomitrium aciculare Brid.
Barbula fallax Hedw.
**B. rubella* Lindb. var. *dentata* Schp.
B. cylindrica Schp.
B. revoluta Brid. (Bewerley)
**Trichostomum tenuirostre* Lindb.
Encalypta streptocarpa Hedw. (Bewerley)
Orthodontium gracile Schwaeg. var. *heterocarpum* Wats. c.fr.
**Mnium cuspidatum* Hedw.
M. hornum L. c.fr.
Pterygophyllum lucens Brid.
Porotrichum alopecurum Mitt.
Heterocladium heteropterum B. & S.
Thuidium tamariscinum B. & S.
Hyocomium flagellare B. & S.
Eurhynchium praelongum Hobk.
E. myosuroides Schp. var. *rivulare* Holt
Plagiothecium elegans Sull.
P. denticulatum B. & S.
P. undulatum B. & S. c.fr.
**Amblystegium furatzkanum* Schp.
A. serpens B. & S.
A. filicinum De Not. (trough at Bewerley)
Hypnum cupressiforme L. c.fr.
H. molluscum Hedw.
H. ochraceum Turn.
Hylocomium squarrosum B. & S.

HEPATICS

Pellia epiphylla (L.) Corda
Conocephalum conicum (L.) Dum.
Marsupella emarginata (Ehrh.) Dum.
Eucalyx obovatus (Nees) Breidl.
Aplozia sphaerocarpa (Hook.) Dum.
Lophozia incisa (Schrad.) Dum.
Sphenolobus exsectiformis (Breidl.) Steph.
Plagiochila asplenioides (L.) Dum. (on wall)
Leptoscyphus Taylori (Hook.) Mitt.
Lophocolea bidentata (L.) Dum.
L. cuspidata Limpr.
Chiloscyphus polyanthus (L.) Corda agg.
**Harpanthus scutatus* (W. & M.) Spruce
Cephalozia bicuspidata (L.) Dum.
C. media Lindb.
Calypogeia trichomanis (L.) Corda
C. Neesiana (C. & M.) K. Mull. (*Meylanii* Buch.)
Lepidozia reptans (L.) Dum. and var. *julacea* Nees.
Trichocolea tomentella (Ehrh.) Dum.
Diplophyllum albicans (L.) Dum.
Scapania dentata Dum.

Film Strips. British Insects. No. 1, The Purple Emperor Butterfly. No. 2, Common Species. Photography and Notes by G. E. Hyde. Produced and marketed by Educational Productions Ltd., 17 Denbigh Street, London, S.W.1. 15/- each.

The first of these film strips consists of 27 frames showing the habitat and distribution, and all stages of the life history of the species depicted. The photographs are very good and together with the notes provided for the teacher's use supply all the required information, though a more common and familiar species might well have been chosen. There are 26 frames in the second strip showing larvae or adults of common species representative of six classes of insects. Ten of the frames show butterflies and moths or their larvae. The photographs are again all good and the notes are adequate though the introduction contains one zoological howler in the statement that insects ' have an internal skeleton '.

BOOK REVIEWS

Some Irish Naturalists : A Biographical Note-book by **R. Lloyd Praeger.** Pp. 208 with 18 plates. Dundalgan Press, Dundalk, 15/-.

Dr. Lloyd Praeger has done yet another service to Irish natural history by gathering together the biographical details which form the main part of this book. In it are given brief sketches of the careers and achievements of some 320 geologists, zoologists and botanists, deceased and living, who have contributed to knowledge of the geology, fauna and flora of the country. The qualification for inclusion is not limited to Irish birth but to residence in the country for a period greater than the short visits—however productive—made by so many English naturalists. This somewhat ill-defined boundary permits the inclusion amongst botanists of G. C. Druce and William West, but excludes H. W. Pugsley and E. S. Marshall. The entries are, of necessity, mostly brief, covering only outstanding points in the life and work of the entrants, but references are given to further sources of information. In a large number of cases the information is based on personal knowledge and the biographical notes are preceded by a very interesting and charmingly written autobiographical chapter in which Dr. Praeger looks back over his long life and recalls his contacts with and impressions of a long succession of notable bygone Irish naturalists. The concluding section gives details of the Scientific Societies, institutions such as botanical gardens and museums, and organised scientific surveys which have from time to time been conducted in various parts of Ireland. To all whose interest in Irish natural history extends to those who have laboured in its cause, this book will be an indispensable source of information.

W.A.S.

The Tunicata, by **N. J. Berrill.** Pp. 354, with Bibliography and 120 figures in the text. Ray Society Monograph, British Museum (Natural History), London, S.W.7. 27/6.

The Tunicata are a group of which few present-day zoologists make a special study and it is more than fortunate therefore that Professor N. J. Berrill has found the time and enthusiasm to produce a Ray Society monograph on them. More than fortunate because the result is a book of outstanding value, not only to specialists but also to the general zoologist and the more advanced student.

The group as a whole is regarded by Professor Berrill as a subphylum of the Chordata ranking equally with four other subphyla, the Pterobranchs, Enteropneusta, Amphioxus, and the Vertebrates. Three classes are recognised, the Ascidiacea, the Thaliacea and the Larvacea. A general account of each class is succeeded by details of the genera and species found near the coasts of Britain.

In the Ascidians, which are all sessile ciliary feeders, habitat is controlled largely by the selectivity and attachment ability of the larva, the form and size of the adult and the mode of specialisation of the test. Most species are restricted to the littoral zone down to 400 metres and only two genera are known to occur in really deep water below 5,000 metres. The test itself seems to be composed of about 60 per cent. cellulose with 27 per cent. nitrogenous material and 12½ per cent. inorganic matter. Histologically it is a kind of mesenchymatous tissue and although definitely secreted by the epidermis the mesenchymatous cells which have migrated into it through the epidermis seem to be essential for its proper maintenance. The brilliant colouring of many ascidians is due apparently to the presence of vanadium. The metal is probably combined with pyrrol rings, somewhat after the fashion of a respiratory pigment, but it has not been possible to demonstrate any respiratory function. Its mode of extraction from the sea is not known ; a single *Phallusia* it seems requires to deplete 20 cubic metres of sea water to obtain its quota.

The pelagic tunicates are divided into two classes, the Thaliacea and Larvacea. Within the former are included three orders, the Pyrosomida, the Doliolida, and the Salpida. The Pyrosomas derive their name from their brilliant phosphorescent qualities. They form tubular colonies, open at one end and with the zooids lying embedded in the wall of the tube. These take in water and eject it into the central cavity whence it is expelled through the open end giving a kind of jet propulsion to the colony as a whole. Large colonies of *P. spinosum* may be as much as four metres in length.

Discovered in 1827 ' the Doliolids have continued ever since to excite interest by virtue of their transparent beauty, fantastic life cycle, and general elusiveness.' Their involved life cycles, together with that of the salps need, for their proper appreciation, adequate illustration and close study.

The Larvacea are small oceanic tunicates with a permanent chordate tail. They have a much reduced endostyle and a single pair of gill slits responsible for drawing water through the mouth. The anterior part of the body secretes a highly specialised ' house ' of gelatinous and membranous material which is very complex and filters large organisms from the water before it is presented at the mouth. The tail is the main organ for maintaining the water current in the house. The development is very similar to that of *Styela* but each organ, stage for stage, has only half the number of cells of the embryo of the ascidian, a remarkable relationship full of significance for the study of development.

Under the headings of distribution, habitat and external appearance is given an account of the natural history of each species as well as details of internal anatomy. To all interested in Tunicates either as naturalists or as academic zoologists this book is indispensable. H. H.

The Birds of the North Kent Marshes, by **E. H. Gillham** and **R. C. Homes.** Pp. 320. Collins, 12/6.

The recording of natural history in terms of the county has been a long-established and useful practice. County boundaries, however, were not always drawn up for the benefit of natural historians. Their weakness is revealed in the stories of observers who have chased rare birds over the border to get the record for two counties. Despite the compromises which have been suggested, there has of late been a strong movement towards treating nature in terms of regions—Snowdonia, the North-west Highlands, etc. Boundaries have, of course, still to be drawn, but in this approach there is more room for latitude and logic than the county allows.

The region covered by the present book—the marshes of the Thames and Medway estuaries and of the Isle of Sheppey—is one that may well not have occurred as a unity to a number of naturalists. Yet they make a composite whole, with sensible boundaries ; on the north, the waters of the Thames itself ; on the south, first the railway from Gravesend to Rochester, then the main road to the Whitstable fork at Brenley corner ; thence, on the east, to the sea at Swalecliffe, where the character of the coast changes, and East Kent may be said to begin.

Although the necessity to draw definite boundaries has led to the inclusion of types of habitat not associated with marshland (with which the authors have faithfully dealt), this book's main concern is with the shore, saltings and reclaimed land behind the sea-walls. Of this task the authors have made a very sound job. Introductory chapters give an adequate picture of the terrain, and much of its history as it affects birds ; especially of its drainage, of its typical bird-communities, and of its place in migration. The greater part of the book consists of a systematic list of the birds. In compiling this the authors have delved deep into past records, but have added very much from their own considerable field-experience. Such lists of birds too often make poor reading, becoming mere catalogues of dates and obituary notices. The authors here have sifted well their data, and have produced readable and informed accounts of the status of their species.

Not only the ornithologists of Kent, but those of neighbouring London, whose marshes they may also be said to be, will welcome the appearance of this authoritative list of birds, against which they can better evaluate the significance of their own observations on this coast-line.

G. K. Y.

Birds of Ceylon, 1 (Familiar Birds of the Garden), by **W. W. A. Phillips.** Pp. 32, with map, 4 photographs by the author and 20 coloured plates by Cicely Lushington. ' Ceylon Daily News ' Press, Colombo, and Langham House, 302-308 Regent Street, London, W.1. 9/- cloth, 5/6 thin boards.

This attractive little book is the first of a series of five which is planned to cover one hundred of the commoner birds of Ceylon. It is, of course, intended for the beginner in bird-watching, and should fulfil admirably the purpose of arousing interest and enthusiasm. The plates, pleasing also from an aesthetic point of view, should be invaluable for identification ; the photographs are, unfortunately,

poorly reproduced. The text is just what is needed, clear and interesting, without excess of detail.

Mr. Phillips has written an admirable short introduction on the different climatic zones of Ceylon and the distribution of Ceylon birds. We look forward to the rest of this series, which we hope will do much to stimulate interest in birds in Ceylon. M.F.M.M.

Handbooks for the Identification of British Insects. Vol. I, Part 6, Plecoptera, and **Vol. I, Part 9, Ephemeroptera,** by **D. E. Kimmins.** Royal Entomological Society, 41 Queen's Gate, S. Kensington, S.W.7. 3/6 per part.

Part 9 on Ephemeroptera (Mayflies) contains 18 pages with 55 illustrations and is a condensed version of ' Keys to British Species of Ephemeroptera ' written by Mr. Kimmins of the Department of Entomology, British Museum, and published in 1942 by the Freshwater Biological Association. Part 9 has useful keys to species (imagines and subimagines) and to genera of nymphs. The drawings are excellent and help to bring out clearly features essential for identification. There are no changes in classification or nomenclature.

Part 6, devoted to Plecoptera (Stoneflies) has 18 pages and 49 illustrations. There has been considerable modification of Hynes' ' Key to British Species of Plecoptera ' (published by the Freshwater Biological Association in 1940), both in classification and in nomenclature. In addition to the identification of imagines, a key to the genera of nymphs is provided. The illustrations attain a high standard, and the keys are not difficult to use.

Inside the cover of the Handbooks it is stated that ' Conciseness and cheapness are main objectives in this new series.' One has the feeling that the former is carried a little too far and the latter not far enough. Eighteen pages is little enough space, but why leave two pages blank in each Handbook? Again, the drawing of *Ephemera danica* on p. 2 fills nearly the whole page. It is certainly decorative and gives a good idea of the beauty of the insect, but it does not fit in with the idea of conciseness. Some of the figures would have been just as clear if drawn on a smaller scale. This would have allowed more illustrations of parts of critical species in the Nemouridae (Part 6) and in the Baetidae (Part 9). In many cases only one pair of characters is used in the keys. A second pair would have been very helpful, especially where a specimen has suffered mutilation. In spite of this Mr. Kimmins is to be congratulated on having given to entomologists useful and up-to-date information on two little known groups of insects.

H. W.

Handbooks for the Identification of British Insects, Vol. IX, Part 2, Diptera, 2 Nematocera : families Tipulidae to Chironomidae, by **R. L. Coe, Paul Freeman** and **P. F. Mattingley.** Pp. 216, with 199 figures, 8vo Royal Entomological Society, 41 Queen's Gate, S. Kensington, S.W.7. 20/-.

This is the largest part of the Royal Entomological Society's Handbooks to be published so far and includes the nematocerous families Tipulidae, Trichoceridae, Anisopodidae, Ptchopteridae, Psychodidae, Culicidae and Chironomidae. The writings of H. Audcent, F. W. Edwards, A. L. Tonnoir and J. F. Marshall form the basis of much of the contents of this part, and many of the original illustrations are reproduced. It is of the greatest value to dipterists to have the essence of these scattered papers, most of them difficult to obtain, modernised, brought up to date and made available in one small volume. No longer can dipterists neglect these fragile but most interesting flies because of the lack of a guide to their identification ; here is the very thing to start them off on a fascinating group of insects. When we look back it is astonishing what progress has been made in thirty years on a very much neglected subject. The publication of the present part will certainly stimulate further research on the families of Diptera on which the late Dr. F. W. Edwards and his contemporaries did such excellent pioneer work two or three decades ago. W. D. H.

The Spider, by **John Crompton.** Pp. 254 with 24 figures. Collins, 10/6.

The classical writtings of the renowned Jean Henry Fabre have for many years encouraged imitators but seldom have any of the resulting imitations been flattering to the poet of Science. Mr. Crompton, in his latest book, *The Spider*, has to some extent captured a little of the style of the great master without being guilty of imitation. Whilst lacking in that sympathetic and intimate understanding which

has endeared Fabre to all true naturalists, he writes sincerely and convincingly upon a subject which for many years has been neglected by most naturalists.

Mr. Crompton offers his readers a fascinating story of the life and habits of spiders which is extremely exciting and vividly portrayed. Written in an easy, flowing and lucid manner the book will undoubtedly appeal to most lovers of nature and even to those to whom spiders are repugnant ; it should also stimulate much interest in these neglected little animals. There is no doubt that Mr. Crompton has made an intensive study of the subject, the results of which he has presented in so capable and entertaining a manner, though many arachnologists will not see eye to eye with some of his theories on animal intelligence as opposed to pure instinct. He is, moreover, such a self-confessed anthropomorphist that it would be unfair to criticise his methods and examples, and furthermore some of his analogies are not only intriguing but quite helpful to the lay-reader, although they may be unscientific.

This book was a pleasure to read and was finally closed with regret. The author has not only maintained his gift of presenting an unusual subject in a skilled and concise manner, but has written an eminently readable book.

A. C. Braham.

Uncommon Wild Flowers, by **John Hutchinson.** Pp. 254 with 203 drawings by the author and 32 photographs by Robert Adam. Penguin Books, 2/6.

This book follows the same plan as its two predecessors, illustrating and describing 203 wild flowers, all of them dicotyledons. The selection is as the author admits ' somewhat arbitrary ', *Geranium molle* and *Senecio viscosus* qualifying for inclusion with such very rare plants as *Arabis alpina*, *Arbutus*, *Cucubalus*, *Corrigiola* and *Moneses*. A key is provided for the identification of the species described and figured in this volume, also a separate key to all the British and introduced species of *Geranium*. The inclusion of keys to the species of other genera in which descriptions of different species are dispersed through three volumes would increase the utility of the work. Needless to say the descriptions and drawings are of a high standard of accuracy and artistic merit and the book is further enriched by the inclusion of 32 excellent photographs by Robert Adam.

The Soil we Live on, by **W. G. Moore.** Pp. 76 with about 100 illustrations. Methuen & Co., Cloth 4/-, Stiff Card 3/-.

This is the fifth title in the *Life and Science* series designed for school children of eleven and over. It deals with the structure and formation of soils, the chemical physical and biological factors affecting soil fertility, and agricultural principles and problems relating to the soil and its most efficient utilisation. The treatment is simple and direct and the information attractively presented with excellent marginal illustrations. It is also educationally sound as it constantly seeks, by the inclusion of directions for performing simple experiments and suggestions for further observations, to stimulate the curiosity of the reader and encourage the scientific method through individual investigation.

Wonders of Wild Life Photography. Pp. 96 with 84 pages of plates. Country Life Ltd., 2-10 Tavistock Street, London, W.C.2, 10/6.

In March the proprietors of *Country Life* organised the second International Exhibition of Wild Life Photography in London. Current press reports testified to the success of the exhibition and the very high standard of the work displayed. This book is a pictorial souvenir of the exhibition, being a selection of some 90 photographs from about 15 times that number chosen by the selection committee for exhibition. It represents the work of expert natural history photographers of many nationalities, the photographs portraying mammals, birds and insects and ranging from ' the lions and elephants of Equatorial Africa, from the chamois of the Alps . . . from the birds of remote islands and deserts to the moles and field mice of our own countryside.' It may be doubted if such a superb collection of photographs of wild creatures, all of them taken in their natural surroundings, has ever before been assembled in one volume. They combine to a remarkable degree scientific interest with artistic merit and technical perfection and as such the book should make a wide appeal to naturalists and photographers. Capt. G. K. Yeates has written an introduction in which he traces the progress of wild life photography over the past fifty years.

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A QUARTERLY
ILLUSTRATED JOURNAL
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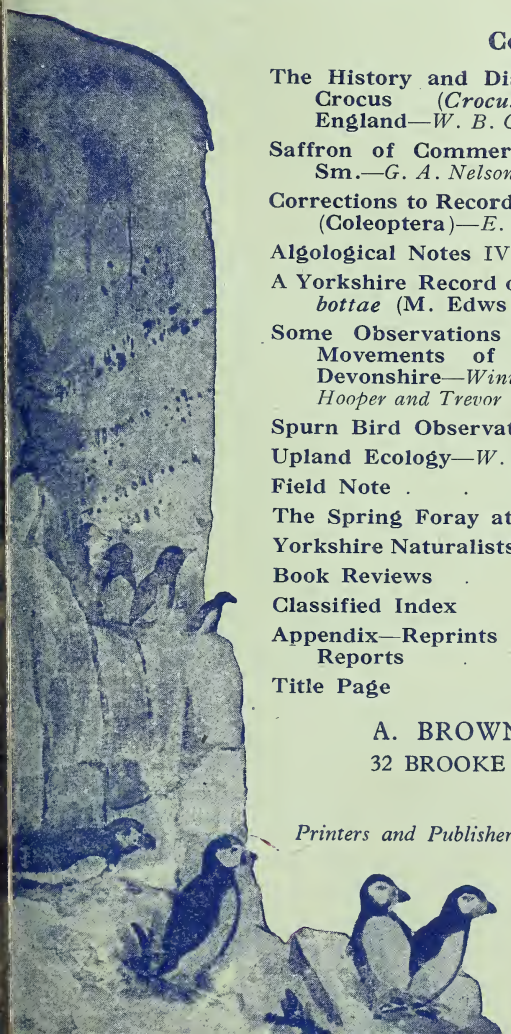

Contents

	PAGE
The History and Distribution of the Autumn Crocus (*Crocus nudiflorus* Sm.) in England—*W. B. Crump and W. A. Sledge*	133-141
Saffron of Commerce and *Crocus nudiflorus* Sm.—*G. A. Nelson*	141-142
Corrections to Records of Yorkshire *Pselaphidae* (Coleoptera)—*E. J. Pearce*	142
Algological Notes IV-VI—*J. W. G. Lund*	143-148
A Yorkshire Record of the Amphipod *Orchestia bottae* (M. Edws.)—*G. Fryer*	148
Some Observations on the Distribution and Movements of Cave-Dwelling Bats in Devonshire—*Winifred M. Hooper, John H. D. Hooper and Trevor R. Shaw*	149-157
Spurn Bird Observatory Notes	157-158
Upland Ecology—*W. A. Sledge*	159-160
Field Note	160
The Spring Foray at Masham—*W. G. Bramley*	161-164
Yorkshire Naturalists' Union Excursions in 1950	165-177
Book Reviews	158, 177-180
Classified Index	181-184
Appendix—Reprints of Y.N.U. Excursion Reports	I-XXII
Title Page	

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YORKSHIRE NATURALISTS' UNION

EXECUTIVE MEETING AT LEEDS UNIVERSITY, NOV. 4th, 3 p.m.

The Meeting will be held in the Old History Library. This is reached via the University Road entrance and then up the stairs leading to the great Hall. The meeting room opens on to the stairs half way up.

Copies of Dr. J. H. Fidler's 'Coleoptera of Askham Bog' (price 1/-) may be obtained, post free, from The Editor of *The Naturalist.*

NOTICE.

Exchange copies of the following periodicals may be had on loan from The Editor of *The Naturalist*, The University, Leeds 2, on receipt of stamped addressed envelope:

The Entomologist.
The Entomologists' Monthly Magazine.
Entomologists Record and Journal of Variation.
British Birds.
Bird Notes.
Science Progress.
Essex Naturalist.
The London Naturalist.
The Scottish Naturalist.
Irish Naturalists' Journal.
Transactions of the Lincolnshire Naturalists' Union.
Transactions of the British Mycological Society.

YORKSHIRE NATURALISTS' UNION

SPURN BIRD OBSERVATORY
WARREN COTTAGE LETTINGS FOR 1950

The Committee desire to have the spring (March to late May) and the autumnal (end of July to mid-November) migration periods covered completely by competent ringers. Preference will be given to Y.N.U. members as far as possible. Charges continue at the rate of 3/- per night per person. Will those willing and able to take charge for periods please agree them with the Hon. Secretary as early as convenient, giving, if possible, alternative dates and periods? This will enable those who can give time out of the holiday seasons to make their plans and to fill blanks. Visits by those who are not registered ringers, short period and week-end occupation, etc., can then be arranged for other helpers who should also apply early. Visits are often difficult to arrange at short notice. With six occupants the cottage is considered full.

G. H. Ainsworth (144 Gillshill Road, Hull),
Hon. Secretary.

THE HISTORY AND DISTRIBUTION OF THE AUTUMN CROCUS (*Crocus nudiflorus* Sm.) IN ENGLAND

W. B. CRUMP AND W. A. SLEDGE

The first part of this paper had been completed and seen by Mr. Crump some months prior to his death on February 10th, 1950. An obituary notice appeared in *The Naturalist*, 1950, pp. 68-70.

The autumn crocus (*C. nudiflorus* Sm.) has long been known as a plant of limited distribution in some of the midland counties of England, from Warwick, Shropshire and Nottingham to South Lancashire and South-west Yorkshire. Within most of this area its stations are few in number though formerly it was abundant enough in some of them. About Manchester, however, there are numerous localities for the plant, whilst in Yorkshire it is associated especially with the Halifax district and nowhere else in the country can it still be seen in so many stations or in such quantity. To Halifax botanists, therefore, the autumn crocus has always been a plant of special interest and its manner of origin, history and distribution have long engaged the attention of one of us (W.B.C.), whose first paper on the subject (*Halifax Naturalist*, 1899, 21-26) was published over fifty years ago. In two later newspaper articles (*Yorkshire Post*, October 1st, 1904, and *Yorkshire Observer*, October 18th, 1909) he gave an account of his observations and the conclusions to which they led respecting the probable origin of the plant in the Halifax area. How far these conclusions will be found to hold for other districts must be left to others to investigate.

It had been the senior author's intention to restate his views about the origin of this plant ; partly in order to include some new facts bearing upon the problem and partly to render them more readily and widely accessible than their original medium of publication made possible. It had also been his intention to give a complete account of its English distribution. But failing health made it impossible for him to undertake the work of preparing this material for publication and this has been done at his request by the junior author who has not hesitated to draw freely upon the two newspaper articles referred to above. For the facts enumerated and the views expressed in the first part of this paper, therefore, the senior author is alone responsible. His notes on localities and records have been revised and numerous additions incorporated.

History

The continental distribution of *Crocus nudiflorus* covers a relatively narrow belt centred about the Pyrenees in North Spain and South France. The French area is practically confined to the provinces of Gascony and Guyenne, the most northerly station being in the Département of Vendée (46° 40′ N.). The wide discontinuity between its occurrence in southern Europe and England is thus strong evidence against its being indigenous in this country, for though some species undoubtedly native in South-west England and Ireland show a similar discontinuity in their distributions, the range of *C. nudiflorus* in England and the circumstances of its occurrence clearly do not point to its being one of this group.

The first British record for *C. nudiflorus* as a ' wild ' plant is in Deering's *Catalogus Stirpium* (1738) where, under the name of *Colchicum commune*, it is stated to grow ' in Nottingham meadows and about Trent Bridge.' In the Halifax area it was first recorded by Bolton, again as *Colchicum*, in 1775. If, therefore, it originated as an escape or introduction it must have been in cultivation in the seventeenth or early eighteenth century. There is no mention of the autumn crocus in Gerard's *Herbal* (1597) and according to Maw (*Monograph of the Genus Crocus*, 1886, 94) ' Parkinson was the first to describe *C. nudiflorus* in his Paradisus in 1629, under the name of *pyrenaeus-purpureus*.' There is some slight evidence that it was known to the Dutch florists in the seventeenth century, but a search through the botanical and horticultural literature of the day leaves us in no doubt that neither here nor on the continent has *C. nudiflorus* ever been a well-known or widely cultivated plant. In this respect it contrasts very sharply with *C. vernus* and *C. aureus*, the cultivated varieties of which were almost as well known and numerous two hundred years ago as they are to-day. Though it is occasionally mentioned in modern gardening books the autumn crocus is seldom met with in cultivation in England and in none of the localities where it grows wild has its presence ever been shown to be due to corms derived from nearby gardens. It

would therefore be inconsistent with the known facts to adopt the simple explanation of its being an escape from cultivation or a garden outcast. To anyone familiar with its present distribution about Halifax such a view is certainly improbable ; indeed it would be difficult to find a garden of any sort near some of the fields where it grows in profusion in this district.

An alternative explanation to account for its presence is that it was formerly cultivated in England not as a garden flower but as a substitute for the autumn-flowering saffron crocus (*C. sativus* L.). Saffron was formerly in great demand and put to a variety of uses as a dye, as a simple medicine and as a flavouring in cookery. The saffron cakes of the West Country are a surviving example of its domestic use.* Saffron consists of the dried orange-red stigmas of *Crocus sativus*, which was formerly cultivated in many parts of England and particularly in the neighbourhood of Saffron Walden in Essex. But saffron crocus has never proved easy of cultivation, demanding special treatment and a light soil so that when the demand for it passed, its cultivation proved unprofitable and it had disappeared from Saffron Walden by 1790.

As regards the early cultivation of saffron, in Gibson's *Flora of Essex* (1862, 311-313) a quotation from Thomas Martyn's *Flora Rustica*, Vol. 2 (1794) is given in which it is stated that ' it was planted abundantly near Walden at the end of the sixteenth and at the beginning of the seventeenth centuries.' The same excerpt is preceded by the statement, ' It is commonly said that saffron was originally brought into England in the time of Edward III and that Sir Thomas Smith introduced it into the neighbourhood of Walden in Essex. We cannot find any sufficient authority for either of these assertions.' But there is evidence that crocuses were in cultivation much earlier than the end of the sixteenth century. In Cornelius Brown's *A History of Newark on Trent* (1, 353, 1904) the will of William Boston is given in full. The first part of it reads as follows :

> ' William Boston of Newarke, Chaplain
> 21st March, 1466.
>
> To be buried before altar of St. Stephen in Newarke Church. My tomb to be covered with a marble stone and on the other stone an image in likeness of my father and another of me.
>
> My best jewel for mortuary.
>
> Children of Thos. Boston of Lincoln 6s. 8d. and of John Wodehede of Market rasyn 20s. Thos. Hette a bed, etc. and Johan his sister a silver cup, etc. Also to them a garden planted cum croco lying at the east end adjoining the chancel of Newarke. Also all heads of crocus planted in my garden at the end of le Appilton Gate, except 6 quarters.'

Reference to an explanatory footnote is given where it is stated that ' The autumn crocus or meadow saffron was cultivated for dyeing purposes and still grows wild in the meadows near Crankley Point.' Again in the article on ' Dyeing and Bleaching ' in the *Victoria County History of Nottingham* (2, 348, 1910) we read, ' Of considerable value to the dyer's trade was meadow saffron or autumn crocus, which still grows wild in the meadows near Crankley Point at Newark.' It would be of great interest to know if the Crankley Point plant referred to was *Crocus sativus*, *C. nudiflorus* or possibly *Colchicum*. But despite the relatively recent dates of the two books in which it is reputed still to grow at Crankley, enquiries have failed to disclose any specimens from here preserved in herbaria and the locality itself has been much altered in the last four decades. William Boston's crocuses may have been the same species ; at all events his will points to an early cultivation of a crocus which was evidently of more than merely aesthetic value.

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* Both crocus and saffron occur many times in lists of goods subject to import duties at various British ports quoted in N. S. B. Gras' *Early English Customs System* (1918). The earliest mention of saffron in the documents referred to by Gras is in the list (*loc. cit.*, 267-270) of customs dues charged at the port of Sandwich, February 10th to May 4th, 1303. This includes the following items : De Johanne Beleu de Paris pro lii libratis x soldatis seffrane . . . xiiis id. ob. (i.e. a tax of 13*s.* 1*d.* on a consignment of saffron valued at £52 10*s.* 0*d.*). Also : De Martino de Lobard pro x libratis seffrane . . . iis vid (i.e. 2*s.* 6*d.* for £10 of saffron). In a later list (*loc. cit.*, 646-647) of ' customs and subsidies on all foods exported or imported by denizens and Hanseatic merchants or other aliens, Lynn, 25 September, 1503—28 September, 1504 ' he alludes to the ' more common ' imports such as '. . . dye (grain, woad, madder and saffron) '. A significant entry bearing on the early cultivation of saffron in this country is contained in the ' Book of Rates, 15 July, 1507 ' (Appendix C, 694-706) where the entries include both ' Saffron of Hyngland ' and ' Saffron of beyownd the se.'

In view of the difficulty of cultivation of saffron crocus save on suitably light soils, it seems more than likely that a substitute for it should have been sought which was less exacting in its soil requirements. The similarity of *C. nudiflorus* to *C. sativus* would at once suggest the former as a possible alternative ; indeed both the Halifax and Derby crocus have been misnamed *C. sativus* more than once, and where botanists have gone astray, farmers and country-folk would be more likely to grow and use one instead of the other in ignorance of their mistake. The stigmas, moreover, of *C. nudiflorus* yield a good imitation of saffron (see Mr. G. A. Nelson's note pp. 141-142 *infra*) whilst the plant has the great advantage over *C. sativus* that, so far from being difficult to grow it is difficult to eradicate when once established. Its tenacity and persistence are due to the possession of a very efficient means of vegetative propagation by stolons, a peculiarity which it shares with only one other species of crocus, the Persian *C. lazicus* Boiss. This stoloniferous method of multiplication has been described by Maw (*Journ. Linn. Soc.*, **19**, 1882), Moss (*Halifax Naturalist*, **4**, 66, 1899) and more recently by Professor F. E. Weiss (*North-Western Naturalist*, 220, 1930). From the parent corm slender stolons grow out for a considerable distance, later becoming detached by the shrivelling of their connecting stalks. Their distal internodes—usually three are involved—swell to form storage organs at first elongate or pyriform in shape. They do not produce any foliage leaves in their first season but later they develop into new corms. The ability to produce new plants in this way at some distance from the parent plant accounts for the power which this species possesses of spreading throughout the fields in which it grows, and thus of giving rise in due course to the delicate and extensive carpet of flowers which was formerly so notable a feature of the Nottingham meadows and which may still be seen in many fields about Halifax.

Where sufficient facts are not available to prove a case, a decision must rest on the most likely interpretation of such data as are available. The considerations so far developed therefore justify the conclusion that it is at least more probable that the yeomen and farmers of the fifteenth and sixteenth centuries planted the corms near their farms along with bistort and other pot herbs in order to yield saffron for their domestic use, rather than that the plant originated as a chance outcast from garden cultivation. For it is just in such situations, on hill farms and about old homesteads, that the autumn crocus is found to-day about Halifax. But the most significant and certainly the most interesting point about these Halifax stations is that not only do they date back for three hundred years, but many of them were the property of the Knights of St. John of Jerusalem or the Knights Hospitallers. Holdsworth House, Ovenden, has still, in addition to the cross (or double cross) that distinguished the possessions of the order, the pigeon-cote or columbarium which used to be a steady source of profit at each manor house. The owner of Holdsworth House, about 1680, bought a place called ' Hill ' in Warley, some miles away. This remained in his family till 1819 and there also the crocus is to be found as it was in 1775. From Holdsworth House and St. John's Cross the crocus may be traced across the fields of Upper Knightroyd and Lower Knightroyd. The names speak for themselves. We find the cross and the crocus together at Upper Winter Edge and St. John's Ing adjoins the farm, whilst High House at Midgley is yet another crocus station possessing a cross and Tincker Hey is known to have belonged to the Knights of St. John.

These facts surely point to something far more than mere coincidence. They seem to warrant the conclusion that the autumn crocus as we see it to-day is a survivor from the days three centuries and more ago when it was grown on old homesteads in place of the saffron crocus. The outstanding difficulty—to explain how a Southern European plant could reach the secluded hill farms of a Yorkshire dale as well as such centres of foreign intercourse as Warwick, Derby, Nottingham and Manchester, is solved by the agency of the Knights Hospitallers. Rents had to be collected, visits to be made even to small outlying farms. Their society was cosmopolitan, their agents formed the one channel of communication with the outside world. When one recalls the legend of the first introduction of the precious saffron into this country concealed in the staff of a pilgrim, it does not seem unlikely that the agents of the Hospitallers should distribute the corms of the autumn crocus either in mistake for or as a good and more easily grown substitute for the true saffron crocus.

Distribution of *Crocus nudiflorus* Sm. in England

The following summary of the distribution of *Crocus nudiflorus* in England includes all the recorded localities we have been able to trace. Only the earliest and latest records are given for well-known stations repeatedly quoted in works dealing with the distribution of British plants.

13. West Sussex

Water meadows at Henfield, 1929 ; E. Payne in Wolley-Dod, *Fl. Sussex* (1937).

Woodmancote, ' apparently wild ', 1934; E. Payne, *loc. cit.*

37. Worcestershire and Gloucestershire

Between Stockton and Newnham Bridge, Worcs. ; Miss Agnes Green, 1934 *Rep. B.E.C.*, 842 (1935).

Meadow between Lower Lode and Chanceley Stock (V.C. 37) ; Serocold, *Fl. Gloucestershire* (1948).

38. Warwickshire

First record 1817 ; W. G. Perry in *Dugdale's Warwickshire.*

Pigwell Fields and Lammas Fields, Warwick ; W. G. Perry, *loc. cit.* Purton *Midl. Fl.*, 3, 7 (1821). Bagnall *Fl. Warwicks.* (1891). Under four trees in the Priory Field, near the boundary wall, 1837 ; Perry MS. in Bagnall *Fl. Warwicks.* Budbrook ; A. B. Jackson, October, 1897, sp. in herb. M. L. Wedgewood. These localities are in or close to Warwick City and the crocus was still at Lammas Fields in 1936 *teste* Dr. R. C. L. Burges.

John Astley (*in litt.*, 1899) ' had been told that the plant did grow somewhere in the neighbourhood of Meriden.' Meriden lies to the west of Coventry.

39. Staffordshire

First record 1821 ; W. T. Bree in Purton *Midland Flora*, 3, 7.

Shut End, Staffordshire ; W. T. Bree, *loc. cit.* Repeated in H. C. Watson, *New Botanists' Guide* (1835), ' probably introduced.'

Abundantly in a field near Wolstanton and in two fields near ; R. Garner, *Nat. Hist. Stafford* (1844). Gathered on October 7th, in a hilly pasture-field just below Wolstanton Church, about a mile from Newcastle-under-Lyme . . . It has existed in the locality above mentioned for a century in plenty. I have also heard on good authority of one other spot in North Staffordshire where the plant grows or did grow ; Eliz. Edwards in *Journ. Bot.*, 346 (1876). Repeated in Maw *Mon.* (1886). At Wolstanton it is close to houses, and is in small quantity ; W. H. Painter *in litt.* (1897). About 10 years back . . . I gathered specimens of *C. nudiflorus* out of the field just below Wolstanton Church ; Mrs. Lynam *in litt.* (1899). Not there now ; W. T. Boydon Ridge in *Fl. N. Staffs.*, 60, 100 (1926).

Two patches in a field at the Grove (near Stoke) ; R. Garner MS. note (1876) in *Nat. Hist. Stafford* communicated by his daughter, Mrs. Lynam.

Biddulph ; W. H. Painter, *Rep. N. Staffs. Nat. Hist. Soc.* quoted in Bagnall *Fl. Staffs.* (1901).

Cheadle ; R. W. Goodall, *Trans. and Ann. Rep. N. Staffs. Field Club*, 16, 72 (1882), in W. T. Boydon Ridge *Fl. N. Staffs.* (1931).

Patshull ; 1917 *Rep. B.E.C.*, 129 (1918).

40. Shropshire

First record 1853; Wm. Whitwell.

In the public grounds known as the ' Quarry ' in Shrewsbury . . . The name ' Quarry ' is derived from the fact that there is an abandoned stone quarry in it now known as the ' Dingle ', which was worked in the middle of the thirteenth century for sandstone. The place has been used from times immemorial as a recreation ground by the inhabitants of the town, and the portions on which the crocus grows were let off as pasture land, but are now mown. They grow under the lime trees on the margin of the public walk ; Wm. Phillips, *Journ. Bot.*, 211-212 (1879). Near Shrewsbury, in the Quarry Walks, about the Dingle, in the grass field and the adjoining field to the west ; T. H. Archer Hind in Maw, *Mon.* (1886).

We are indebted to Mr. L. C. Lloyd, of Shrewsbury, for the following information relating to the distribution of *Crocus nudiflorus* in Shropshire (*in litt.*, February 28th, 1944) :—

This (i.e. the Quarry) seems to be the main Shropshire station for the species. W. P. Hamilton, writing in 1914, says ' This has been observed growing in the Quarry, Shrewsbury, for very many years. It seems to have increased, and every spring its leaves can be seen forming distinct dark green, often extensive, patches among the grass.' Three years ago a considerable part of the Quarry was ploughed up for vegetable growing, but the crocus persists and several considerable patches are still to be seen . . . There was a priory of Austin Friars practically adjoining the Quarry up to 1536 ; the ruins of its buildings stand only about 200 yards from the crocus station. A Franciscan friary stood about a quarter of a mile away in the opposite direction, and there was also a hospital of St. John Baptist not far away. There does not appear to have been any foundation of the Knights of St. John or the Templars in Shrewsbury.

Poplar Island, Shrewsbury, 1891 ; W. Pearson Phillips.

Plealey, about five miles S.W. of Shrewsbury ; sp. in herb. R. de G. Benson. Not known there now.

Withington Churchyard, seven miles east of Shrewsbury ; W. G. Beckwith *ca.* 1880. Seen here 1925 by Dr. M. Gepp. Church dedicated to St. John the Baptist, but no record of any monastic foundation.

Field near Woolstaston, about nine miles south of Shrewsbury ; W. G. Beckwith *ca.* 1880. The present rector has no knowledge of the plant's occurrence in his parish.

54. North Lincolnshire

Lea Marsh, 1885 ; Anderson. There in 1897. Carried by the R. Trent from its Notts. locality? E. A. Woodruffe-Peacock in *Vict. Co. Hist. Lincs.*, Vol. 1 (1903). In the *Check List of Lincolnshire Plants* (1909) the finder is given as Cochin *vice* Anderson, and in Woodruffe-Peacock's MS. notes at Cambridge the record is given as : Lea Marsh, 1885-1895 ; Revd. C. E. Cochin. Confirmed by Miss Anderson.

56. Nottingham

First record 1738 (as *Colchicum commune*) ; C. Deering, *Cat. Stirp.*, 57. In Nottingham meadows and about Trent Bridge ; Deering, *loc. cit.* The plate in Sowerby *Eng. Bot.*, Ed. 1, t.491, dated September 1st, 1798, is from a Nottingham specimen. Between Nottingham Castle and the Trent . . . For more than a century these beautiful plants (*vernus* also) have enamelled the Nottingham meadows . . . and the *Colchicum commune* of Deering proves . . . to be our *Crocus nudiflorus* ; Ordoyno, *Fl. Notts.* (1807). Between Nottingham Castle and the Trent ; Rev. Mr. Becher, *Bot. Guide* (1805), *New Bot. Guide* (1835). Nottingham meadows ; fields near St. Ann's Well ; Nottingham Park; and in several fields between Fox Lane and Mapperley Hills ; Howitt, *Fl. Notts.* (1837). Nottingham meadows side of M. Rail. Another locality on opposite side of Trent at West Bridgford is entirely built over. Soon the only stronghold will be the field adjoining the new Forest Football Club ground near the Trent Bridge ; F. B. Whitlock, *Nat.* 55-56 (1892).

Information supplied by Mr. H. H. Mather in 1944 confirms the survival of the crocus in two stations, at Wilford and at Lenton close to Nottingham on the opposite side of the Trent.

57. Derbyshire

First record 1787 (as *C. sativus*) ; Withering *Bot. Arr.*, Ed. 2. Duffield near the banks of the Derwent : J. Pilkington, 1789 (as *C. officinalis*) *vide* W. R. Linton *Fl. Derbyshire* (1903). Holmes and Siddals near Derby : Breadsall : and Duffield near the banks of the River Derwent ; J. Pilkington *Bot. Guide* (1805). Repeated in *New Bot. Guide* (1835) (as *C. sativus*). In a large meadow called the Siddalls, on the banks of the Derwent, near the Derby railway station ; J. Whittaker, *Phyt.*, 2, 668 (1846). Near Derby, J. Whittaker ; Maw *Mon.* (1886). At Derby (in meadows called ' the Siddals ') it is close to

houses and I fear has been or will be destroyed by the M. R. Co. There used to be thousands of the plant there : W. H. Painter (*in litt.* 1897).

Meadows by the Trent, Repton ; *Wild Fl. Rept.* (1866), and in Wm. Garneys' *Fl. and Fa. Rept.* (1881), and W. R. Linton *Fl. Derbys.* (1903). W.B.C. adds : doubtful, *Colchicum* is found in the meadows near the river below Repton.

58. Cheshire

First record 1859 ; Isaac Williamson in L. H. Grindon's *Manchester Flora*. But the statement that it was common in the neighbourhood of Manchester in R. Buxton, *Bot. Guide* (1849) probably covered Cheshire localities.

Bramhall (Mr. Isaac Williamson) ; Thelwall near Lymm ; L. H. Grindon *loc. cit.* Repeated in Lord de Tabley's *Flora of Cheshire* (1899). In 1898 L.H.G. wrote ' among grass near Bramhall Hall, near Stockport, a few years ago.' In another letter (1899) he states that at Thelwall ' I remember seeing the crocus many years ago ' and also adds a station at Warburton near Lymm.

Werneth Low and Hattersley ; *Fl. Ashton-under-Lyme* (1888).

C. E. Moss found it in 1905 at Handforth and Styal south of Cheadle. He wrote to W.B.C. in 1904 that the record for *Colchicum autumnale* in the *Flora of Cheshire*—Plentiful in a meadow at Shaw Moor a mile S.W. of Stalybridge, 1873 or 1874 : Walker—was ' almost certain ' to be *Crocus nudiflorus*. Fields at Disley ; F. E. Weiss, *N.W. Nat.*, 220 (1930).

Using the county divisions employed by de Tabley, the Cheshire stations may be re-listed as follows :

1. Bramhall (I. Williamson) : Werneth Low and Hattersley (*Fl. Ashton-under-Lyme*) : Handforth and Styal (C. E. Moss), Disley (F. E. Weiss) : ? Shaw Moor near Stalybridge (*Fl. Cheshire* sub *Colchicum*).
2. Thelwall and Warburton near Lymm : L. H. Grindon.

59. South Lancashire

First record 1835 ; T. Scholes in H. C. Watson *New Botanists' Guide*.

Numerous stations for *C. nudiflorus* have been recorded in South Lancashire, especially about the Mersey and Irwell in the neighbourhood of Manchester.

Prestwich. In a meadow near Prestwich ; T. Scholes, *loc. cit.* In a field about a quarter-mile S.W. of Prestwich Church, in great abundance ; R. Buxton *Bot. Guide* (1849). Also in a field near the upper end of Mere Clough ; *loc. cit.* (Mere Clough is a ravine near Prestwich and the longest of the cloughs leading into the Irwell). About Prestwich, above the Dells ; L. H. Grindon, *Manch. Fl.* (1859). (The Dells is a clough below the church leading into the Irwell.) In a low meadow on the further side of Kersal Moor, near the rivulet ; also in the fields below Prestwich Church, again in those between the Asylum and the Dells ; L. H. Grindon, *Manch. Walks and Wild Fls.* (1859). (Kersal Moor is close to Prestwich and the Asylum in or near Mere Clough.) Prestwich Clough and Kersal Moor ; J. C. Melvill (1876). Most abundant and a characteristic plant of the locality in the meadowland by Singleton Brook, and also more rarely by Bleackley's Works ; J. C. Melvill, *Journ. Bot.*, 216. (1882). Every year very plentifully in two or three localities (near Prestwich) and sporadically elsewhere : (*a*) fields to the W. of the Parish Church, trending down towards Prestwich Clough, with S. aspect ; (*b*) fields sloping south overlooking the W. portion of Kersal Moor, divided from these fields by Singleton Brook ; (*c*) in the fields also sloping southwards at Besses o' th' Barn, towards the E. end of Mere Clough ; J. C. Melvill (*in litt.* 1899). Seen by W. G. Travis on October 3rd, 1939, in Buxton's old station at Prestwich, S.W. of the church. The field was converted into allotment gardens about 1920, but the plant still persists though much reduced in quantity.

Mersey. Common in the neighbourhood of Manchester. In a meadow on the right bank of the Mersey about threequarter-mile below Northen Ferry. On the right bank of the Mersey, about half-mile below Jackson's Boat. At a place where the Hough End brook falls into the Mersey ; R. Buxton *Bot. Guide* (1849). Near Northen (=Northenden) : Jackson's Boat. Abundant in meadows by the river at Didsbury ; L. H. Grindon *Manch. Fl.* (1859). Meadows near Manchester, very common ; Maw *Mon.* (1886). Extremely common on the south side of Manchester in fields with clayey soil near Northenden and Didsbury ; J. C. Melvill *comm.* (1899). Pastures and meadows by the Mersey at Didsbury and Chorlton-

cum-Hardy ; J. E. McDonald per W. G. Travis. Saw patches of the leaves on the dyke slopes and on the banks (right) of the Mersey between Northenden and Cheadle, i.e. near Didsbury, March 29th, 1905. W.B.C.

Rochdale. Rochdale (Mrs. Atkins) ; Maw *Mon.* (1886). Fields very widely distributed and locally abundant ; F. Williamson *Flora of the Rochdale District* (1913). In the *Rochdale Field Naturalists' Journal,* 1, 3, November 1885, it is recorded by A. Pearson as growing ' somewhat profusely at Healey on the hillside abutting Whitworth Road, nearly opposite the Post Office.' Also, ' In a field beside the pathway leading from Foot Wood towards Hollows Farm ' and ' Mr. James Hall found them on October 11th growing in great abundance at Moor Bank Farm near Rochdale.' A considerable quantity of these bulbs in flower in a field on the outskirts of Rochdale ; Jane Fishwick, *Science Gossip,* November 1885.

Other localities between Rochdale and Manchester are Royton, Thornham and Middleton, plentifully ; R. Buxton *Bot. Guide* (1849). Thornham ; Eccles (Joseph Sidebotham) ; Reddish (Mr. Hammond) ; L. H. Grindon, *Manch. Fl.* (1859). Very common about Middleton and appears in abundance in several places during October ; J. Greenhalgh, *Rochdale Field Nats. Journ.,* 1, 4, December 1885. Chadderton ; *Fl. Ashton-under-Lyme* (1888).

In the western half of South Lancashire records are fewer and the stations more scattered.

Adlington, near Wigan, J. H. Hoarse ; Maw, *loc. cit.* (I have no records of the plant from the Wigan district ; W. G. Travis *in litt.*). Wilpshire near Blackburn ; *Lancs. Nat.* (1912). Darwen ; J. W. Bamber per W. G. Travis. Warrington, Maw, *loc. cit.* . . . from the date (1830) of Hook. *Br. Fl.* Ed. ii onwards this species has been given (under the name of *C. speciosus* Bieb.) as a plant of the Warrington neighbourhood on the authority of the late Mr. W. Wilson ; Lord de Tabley, *Fl. Cheshire* (1899). Meadow, Warrington ; J. F. Robinson, *Fl. Liverpool* (1872). Howley fields near Warrington, J. J. Smith ; G. A. Dunlop, Alien Flora of Warrington, *Mem. and Proc. Manch. Lit. and Phil. Soc.,* 52, 3, (1908).

A mile and a half from Liverpool on the road to Allerton, Mr. Shepherd ; Withering, *Nat. Arr.,* Ed. vi, 2, 95 (1830). Repeated in *Fl. Liverpool* (1872) with addition ' noticed here lately by Mr. Robert Holland.' Long extinct in this locality. I have no other record from the Liverpool area : W. G. Travis (*in litt.,* February 8th, 1944).

60. West Lancashire

First, and only, record 1905 near Goosnargh (N. of Preston) ; R. Standen *in litt. ad* J. C. Melvill, *Vict. Hist. Lancs.* and Wheldon and Wilson *Fl. W. Lancs.*

63. South-West Yorkshire

First record 1775 (as *Colchicum autumnale*) ; J. Bolton, Catalogue of plants growing in the parish of Halifax, in J. Watson *History and Antiquities of the Parish of Halifax.*

Halifax District. In Crump and Crossland's *Flora of Halifax* (1904) a chronological list of published records from the Halifax district is given, followed by a detailed enumeration of the twelve localities in which the crocus was at that time known to occur. Repetition here of the historical records would be superfluous. Additional localities discovered or brought to light since the publication of the *Flora* bring the total number of stations for the plant in the Halifax area up to twenty-three. These stations, scattered over an area of about 50 square miles, are listed below. In the case of those already discussed in the *Flora* details are omitted except where new facts are available bearing upon subsequent changes in the sites. In only two instances has the plant been destroyed, in both cases by the formation of allotment gardens. It is probable that in all the other stations listed the crocus is still to be found. Mr. F. Murgatroyd informs us that he has personally seen the plant in sixteen of these localities.

1. Well Head fields. This pasture at Well Head was turned into allotments in 1918 and subsequently cleared and put back to grass in 1922. Crocus destroyed.

2. Upper Winter Edge Farm, Coley. Known here for at least 130 years and still there.
3. Ovenden Hall.
4. Watkinson Hall Park, Ovenden.
5. Ovenden Brook, north of Holmfield ; in numerous fields near Holdsworth House to Lower Scolecroft and Woodlands farms.
6. Spring Gardens, Wheatley. Known for over 130 years and still there.
7. Abundant in a field on the left bank of the Hebble Brook near Box Trees Mills, Wheatley.
8. Warley Clough.
9. The Hollins, Warley.
10. Fields just below Booth Stead Farm, below Sentry Edge, not far from the Hollins situations ; H. Walsh, 1943.
11. Cold Edge, Warley, at 1,400 ft. Known here for a century and still (1949) plentiful.
12. Field approaching Magson House from Luddenden Foot ; H. Waterworth, 1923.
13. High House Farm, Midgley, and Booth on opposite side of Luddenden Brook.
14. Shaw Edge Farm pastures above Sage Wood, Soyland. First reported in 1893. The dark patches of leaves filling a large proportion of the field very conspicuous (April 12th, 1902) and easily distinguished from the other side of the valley (Sage Clough) at Clay House. It also occurs in small quantity on the left bank of the stream, the other side of Sage Wood from the farm, just above the stepping stones (April, 1902). Said to be gathered ' in armfuls ' by schoolchildren at Sage Wood pastures ; C.W., September 18th, 1912. Still abundant there, 1949-50, W.A.S.
15. Field behind Making Place, Soyland ; J. Firth per J. H. Lumb, 1923.
16. Left bank of Ryburn Stream, above Thorpe in three places ; F. Murgatroyd.
17. Turn Lee Farm, Cotton Stones, Sowerby.
18. Pasture at Deer Play Farm, near Triangle, Sowerby.
19. In great abundance a few years ago in a field above Goat House, Rishworth, *teste* J. Firth, November, 1901. Still there ; F. Murgatroyd.
20. Upper Cockroft, Rishworth.
21. Tincker Hey, Greetland, below North Dean Wood ; J. H. Lumb, 1910 and 1923. Still there ; F. Murgatroyd.
22. A patch in Pye Nest going towards Sowerby Bridge ; J. H. Lumb, 1923. The crocus has flowered in Pye Nest to my knowledge for some eight or nine years ; *id.* Destroyed here by building and allotment gardens ; F. Murgatroyd.
23. Meadow below Great House, Eastwood. ' I have not seen it here, but am informed by Todmorden naturalists that it still exists ' ; F. Murgatroyd *in litt.*, May 1950.

Birkby ; *Hud. Nat. Hist.* in Miall and Carrington, *Fl. West Riding* (1862). In considerable quantity at Birkby ; *Fl. Halifax*, 106, (1904). By junction of Blacker Road and Halifax Road, i.e. New North Road (=Edgerton) near Huddersfield ; J. Grainger.

Wood Brook and Delph ; *Fl. Ashton-under-Lyme* (1888). Swampy field behind Eagle Mill, Delph ; Mark Berry per Ben Hirst, 1899.

Gathered in a meadow between Norton and Sheffield ' in the same valley with the Sheffield Nursery ' ; Stokes, *Bot. Comp.*, 206, in Lees *Fl. West Yorks.* (1888).

Hickleton near Doncaster, ' in the pastures round there it grew very abundantly in the rich aftermath ' ; J. Firth. W.B.C. comments ' probably *Colchicum* ' but later, after seeing him and visiting his Ryburn (Halifax) site, adds ' seems certain it is. He knows the difference.' But there are no earlier or later records for the Doncaster area.

Entered for North-West Yorkshire in the *Comital Flora*, but we are unable to trace any record from the North Riding.

69. WESTMORLAND

Near Arnside ; T. K. Cuckney per J.N.F(rankland) in Wilson *Fl. Westmorland* (1938).

72. DUMFRIES

Escape. Stuart's Wood, Canobie, 1890; Ethel Taylor in Scott-Elliot *Fl. Dumfrieshire* (1896).

Summary

Geographical considerations preclude *Crocus nudiflorus* from being considered indigenous in Britain.

It was first recorded in England as a 'wild' plant from Nottingham in 1738 and from Halifax, where it is now more plentiful than in any other district in England, in 1775.

It has never been extensively cultivated either in Britain or on the Continent.

There is no evidence to show that it is of garden origin in any of its long-established English stations.

Saffron, obtained from the cognate, autumn-flowering *Crocus sativus* was extensively utilised in England between the fourteenth and eighteenth centuries.

The importation of saffron dates from the earliest years of the fourteenth century and *C. sativus* was being grown commercially in England in the sixteenth century.

Evidence is provided of the mid-fifteenth-century cultivation of an unspecified species of crocus.

C. nudiflorus readily propagates itself by stolons and is easy of cultivation, whereas *C. sativus* is non-stoloniferous and more exacting in its soil requirements.

The stigmas of *C. nudiflorus* yield a good imitation of saffron.

It is suggested that the origin of *C. nudiflorus* in its English localities is due to its being grown as a substitute for the saffron crocus.

Many of the localities in which *C. nudiflorus* grows in the Halifax area are known to have belonged to the Knights of St. John of Jerusalem or Knights Hospitallers, to whose agents its introduction in this district is attributed.

A summary of its English distribution is given.

SAFFRON OF COMMERCE AND *CROCUS NUDIFLORUS* Sm.

G. A. NELSON

THE dried stigmas and tops of the styles of *Crocus sativus* L. have long been used as a domestic remedy for culinary purposes under the name saffron.

The earliest mention of crocus as an official drug occurs in the list of drug-simples of the second London Pharmacopoeia dated 1650. This refers, however, to the whole flower, species unnamed, and its inclusion in the elaborate formula of a 'Blessed Laxative' indicates that this does not refer to saffron. The earliest official record of saffron appears in the third Edinburgh Pharmacopoeia dated 1736, its first official recognition in England occurring in the fifth London Pharmacopoeia, 1746. Saffron maintained its position as an official drug until its deletion from the fifth British Pharmacopoeia in 1914.

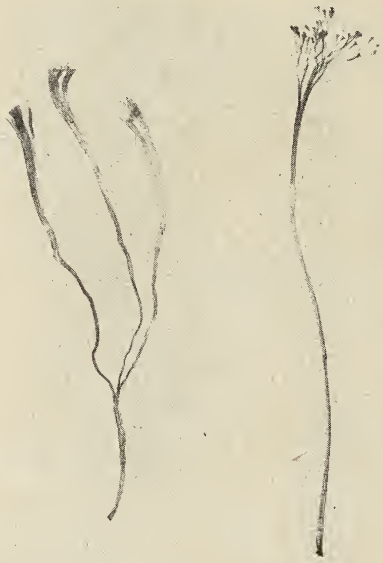
Various factors contribute to the necessarily high price of saffron, notably its peculiar cultural requirements, but more especially the fact that some 3,500 flowers are required for the production of one ounce of dried stigmas and style-tops. For these reasons, saffron is notoriously subject to adulteration and substitution. Adulteration usually takes the form of artificial weighting of the drug with vegetable or mineral oil, with glycerine or ammonium nitrate or by the inclusion of stamens or an excessive length of style. Substitutes of saffron are all too frequent and include the florets of marigold, *Calendula officinalis* L., known as Chinese safflower or Feminell and of *Carthamus tinctorius* L. The latter is offered for sale in the form of a red paste consisting of the florets pulped in syrup.

Mr. Crump's suggestion (*vide* Crump and Sledge, *The Naturalist*, 1950, p. 135) that the Knights Hospitallers cultivated *Crocus nudiflorus* Sm. for use as a saffron substitute is of interest in that an exhaustive search of the literature on saffron has failed to reveal any record of such substitution *in commerce*. With a view to ascertaining whether such a substitution was appropriate, flowers of *Crocus nudiflorus* Sm. were collected from Shaw Edge pastures above Sage Wood, Soyland and their stigmas were subjected to the same process as for the production of saffron. The product was examined chemically and no material difference between genuine saffron and *C. nudiflorus* could be detected. The two have approximately the same tinctorial value both in water and in alcohol and give the same density of blue colouration to concentrated sulphuric acid. These reactions

are due to the presence of a mixture of glycosides collectively called polychroite or crocin.

In view of the peculiar cultural demands of *C. sativus* compared with the ease with which *C. nudiflorus* can be grown, it is remarkable that the latter species has not replaced saffron or at least ever been recorded as an adulterant. The two drugs are, however, structurally easily distinguishable. Genuine saffron consists of three long red trumpet-shaped stigmas, which fuse at their narrowed bases into the long slender pale-yellow style. Only a short length of the style, a length adequate to hold together the stigmas, should be included in the officinal drug. The stigmas of *C. nudiflorus* are shorter and more slender ; each stigma divided into a number of segments just above the stigma-style junction.

The photograph shows saffron with a length of style acceptable for officinal purposes ; in *C. nudiflorus* the stigmas and style are shown entire.



Style and stigmas of *Crocus sativus* L. (left), and *C. nudiflorus* Sm. (right) ; × 1½.

CORRECTIONS TO RECORDS OF YORKSHIRE *PSELAPHIDAE* (COLEOPTERA)

In *The Naturalist* (1947, p. 16) I recorded *Biblioplectus pusillus* (Denny) from Askham Bog, Yorks. Mid-West ; and in the *Ent. mon. Mag.*, 1948 : **84** : 87-8, I recorded *B. margaretae* Sharp from Skipwith Common, Yorks. S.E. At the time these identifications (over which I received assistance) appeared quite correct. Subsequent study of the genus however shows that these identifications are erroneous and must be withdrawn, for the specimens from both these localities belong to a species apparently new to science (*B. 'championi'*) which will be described in due course, probably in the *Ent. mon. Mag.*

In Dr. J. H. Fidler's most useful paper on the ' Coleoptera of Askham Bog ' (*The Naturalist*, July, 1949) on pp. 109-110, he credits me with having taken *Pselaphus dresdensis* Hbst., *Reichenbachia impressa* Panz., and *R. juncorum* Leach at Askham Bog. In my published note to which he gives reference I actually stated that though these species had previously been recorded for the Bog I had so far entirely failed to find them there. (The record of *B. pussilus* (*sic*) which he also includes I have corrected above.)—E. J. Pearce,

ALGOLOGICAL NOTES IV-VI

IV. Motility in unicellular and colonial Myxophyceae and records of the occurrence of some of the species in Great Britain.
V. *Chlamydomonas terricola* Gerloff.
VI. The distribution and ecology of *Stephanosphaera pluvialis* Cohn with a note on *Haematococcus lacustris* Flotow em. Wille.

J. W. G. LUND
Freshwater Biological Association, Ambleside.

IV. Pringsheim (1949) reviewing our knowledge of motility among non-filamentous Myxophyceae states (p. 60) ' it remains doubtful if there are any completely immotile Myxophyceae.' While there is, as yet, only rather scattered data in support of this statement, motility is recorded in a wide range of genera. Examples of movement among such algae have often come to my notice ; indeed, this frequently makes it very difficult to draw live specimens with the aid of a camera lucida. Since the movements observed are often slow and of an irregular gliding nature, care must be taken to ensure that what is observed is not, for example, induced by convection currents. In the examples given below, the algae were always observed under a ringed coverslip and diverse particles were included so that any streaming movements in the medium could be detected.

Merismopedia elegans A. Br. and *M. glauca* (Ehr.) Näg. Movement in these ubiquitous species is similar to that in *Holopedia* (Lund 1942*a*). Under the microscope, movement of large colonies is hard to detect, but it is clearly seen in small ones. The maximum rate of movement appears to vary inversely with the size of the colony. This agrees with the relatively fast movement of isolated pairs of cells in *Holopedia* (Pringsheim, 1949, p. 60). Movement of large colonies seems to be affected by light ; they creep some way further up the sides of test-tubes, the lower portions of which are blackened, than up those which are not blackened. The usual movement seen under the microscope is irregular in that the colonies move in or out of the field of view though they generally move out of patches of mud into clear areas. They show a reaction to strong light. If illumination is kept low the colonies remain with their broad faces at right angles to the incident light rays (and so to the observer), if illumination is then strongly increased they often perform a remarkable swinging movement as a result of which they present one of the narrow edges of the plate-shaped colony to the source of light.

The colonies on the littoral deposits (down to 10m.) of Windermere vary widely in colour. The cells may be not only blue-green but also various shades of reddish-violet or, rarely, green. All the live cells of a colony are the same colour. Such so-called sun and shade forms are well known even on shallow water deposits (Fritsch, 1945, pp. 784-86), though their occurrence together still needs explaining. It may be due to water-movements which, in storms, can be of considerable violence down to at least 10m. in Windermere. Under these conditions colonies which have developed a particular colouration under one set of light conditions may be moved to a different depth, and so conditions, but retain their colour for a time at least. In this way populations of mixed colours would not be uncommon. In the colonies I have observed, the movements have not shown any significant difference in relation to colouration.

Eucapsis alpina Clements and Shantz (1909) shows similar movements. It is recorded as rare in Great Britain. However, it is widely distributed over the English Lake District. Colonies are most frequently found on the deposits of peaty boggy tarns, especially some distance in from their margins. For this reason collection is often difficult and so their occurrence is overlooked. Particularly rich collections were obtained by Mr. G. J. Thompson when a number of tarns on Claife Heights, Lancashire (Freshwater Biological Association Seventeenth Annual Report) were drained (for a previous record from one of them see Pearsall, 1936). Böcher (1949) records it from brackish water on sulphurous and highly organic mud. Var. *minor* Skuja not previously recorded from Great Britain, also occurs sparsely with the species in the English Lake District. The species itself varies widely in cell-dimensions (compare fig. 1, A and B).

The colonies are usually composed of few cells (from eight to 32) and their cubical arrangement may be rather irregular. Aggregates of several small colonies are not uncommon (fig. 1, A). The combination of large size (up to 512 cells) and extreme regularity of the cubical arrangement depicted in the much-reproduced figure of Clements and Shantz (1909) has not been observed.

Aphanothece microscopica Näg. and *A. stagnina* (Spreng) A. Br. Both these algae are of widespread occurrence and macroscopic colonies of the latter are a regular feature of the flora of the deposits in Pull Wyke bay, Windermere. I have not observed movement of the colonies in either species. If the rate of movement shows a similar relationship to size as in *Merismopedia* this is not surprising, for the colonies of both species are relatively large. Moreover, there is great difficulty in the identification of colonies of a few cells in genera such as *Aphanothece*,

Fig. 1.

A-C, Eucapsis alpina Clements and Shantz, A, compound colony, *B*, small-celled colony ; *C*, movement, colony in original position shown *black*, position after twenty minutes *white*, after thirty minutes *cross-hatched*. *D, E, Aphanothece microscopica* Näg. *D* movement of three and *E* of two cells within the colonial envelope ; in both the position of the cells shown every five minutes, arrows indicating the path followed. *C* × 300, the rest × 750.

Aphanocapsa and *Microcystis* and, on deposits, several species and genera commonly occur together.

A remarkable feature of *A. microscopica* is the movement of the cells within the colonial envelope. That shown in fig. 1, D, E, illustrates its apparently haphazard nature, cells lying close together moving in different directions and at different rates. I was unable to observe such movement in *A. stagnina* which may be related to the more viscous mucilage in this species.

Chroococcus turgidus (Kütz.) Näg. is of widespread occurrence on peaty deposits and is often the dominant species in small high tarns lying on thin eroded peat in the English Lake District. Pringsheim (1949) has recorded movement in a variety ; it is also common in the species.

Synechococcus aeruginosus Näg. occurs in similar habitats to the last species but also on other types of deposit. Though so widespread, it is rarely abundant.

It shows active movement and as Pringsheim (1949, p. 69) points out, resembles *Achromatium* Schewiakoff (*Hillhousia* G. S. West and Griffiths) in this as well as in morphology, apart from the sulphur globules which are usually a marked feature of the cells of the latter. *Achromatium*, which the author agrees with Pringsheim (*loc. cit.*) would appear to be a colourless member of the Myxophyceae rather than a bacterium, is even more common and often abundant on muds, particularly those which are more or less peaty. Its movements are not due to flagella.

Coelosphaerium spp. A number of unnamed species occur on the littoral deposits of lakes and in tarns in the English Lake District. They show similar colourations and movements to those of *Merismopedia*. By contrast *C. naegelianum* Ung. shows no motility. This alga is a common and sometimes abundant (e.g. Loweswater) plankton alga in lakes developing a Myxophycean plankton. When alive under a cover-glass (or in formalin) the colonies often disintegrate due to the cells being shot out of them. I have found no evidence that this occurs under natural conditions and it remains doubtful whether this is a method of reproduction (Fritsch, 1945, p. 804). Not even these single or paired cells show any motility.

Gomphosphaeria lacustris Chod. and *G. aponina* Kütz. also do not appear to be motile, though it has not been possible to do any extensive observations. The latter is uncommon and occurs mainly in tarns, the former occurs in the plankton of several lakes in the English Lake District.

Microcystis spp. are similar to those in *Coelosphaerium* in that motility occurs in small colonies on the bottom, but not in the large planktonic *M. flos-aquae* (Wittr.) Kirch. and *M. aerginosa* Kütz. *M. flos-aquae* occurs in Esthwaite Water and Windermere but *M. aeruginosa*, though common in many productive lakes in Cheshire, Shropshire, Wales and elsewhere, is absent in the English Lake District at present (1945-50) though recorded for several lakes by Pearsall and Pearsall (1925).

To summarise, there are a number of colonial Myxophyceae in which it has, so far, been impossible to demonstrate movement ; particularly is this so for the planktonic species. The general occurrence of motility among forms living on underwater deposits is clearly of biological value (Lund, 1942*b*, p. 275).

V. *Chlamydomonas terricola* Gerloff (1940). Fig. 2.

The cells (13-21μ l ; 9-16μ br.) are oval to subspherical except when young, when they may be oval-elliptic (fig. 2, I). The apical papilla is truncate with an usually emarginate apex (fig. 2, F-H). Sometimes it is flat in one plane and, rarely, in both ; apart from this it does not differ in appearance from either side of the cell (comp. fig. 2, A, B, E with C, D, J, K). Though visible in living cells, it is better seen in stained preparations. The flagella are as long as, or up to one and a half times longer, than the cell. There are two anterior contractile vacuoles (fig. 2, M). The chromatophore is basin-shaped, but in some cells so little of the anterior end of the cell may be free of it that it becomes almost spherical (fig. 2, J, K). There is no basal thickening and the inner margins may not be clearly differentiated from the cell lumen. The lateral pyrenoid is large or very large and usually rather irregularly oval (fig. 2, B, K, L) to sub-spherical (fig. 3, D, J, M) ; it does not lie in a thickening of the chromatophore but a large part protrudes into the lumen of the cell (fig. 2, C, E, M). The starch sheath is of irregular thickness but commonly forms, in part, spirally arranged lines running round a part or the whole of the pyrenoid (fig. 2, C, D, J, L). The large stigma usually lies near the pyrenoid about half-way down the cell. Seen from the front or back it is irregular in shape though often more or less oblong to rounded rectangular (fig. 2, J, K). Seen from the side it is plano-convex with most of the pigment on the concave (inner) side (fig. 2, B, C, D, I, L). The large nucleus is anterior or central.

There are four to eight (to sixteen according to Gerloff (1940)) swarmers. No palmella stages are known. Sexual reproduction was not observed. Gerloff (*loc. cit.*) states it is monoecious, the isogametes fusing to form a quadriflagellate zygote which is at first motile but later rounds off and forms a smooth three-layered wall.

The specimens on which the present account is based developed abundantly on mud from the littoral deposits of Blelham Tarn, Lancashire, and later were cultured in solution No. 10 of Chu (1942) with the addition of sterilised Blelham mud. Both on the natural and on the enriched mud, the cells showed a good agreement

with the type cultures made by Gerloff (1940) from soil collected near Berlin. *C. moewusii* Gerloff differs in the usually smaller and more elongate cells, rod-shaped stigma and papilla which is low and broadly truncate in the plane in which the flagella are inserted and a small rounded cone in the opposing plane ; *C.*

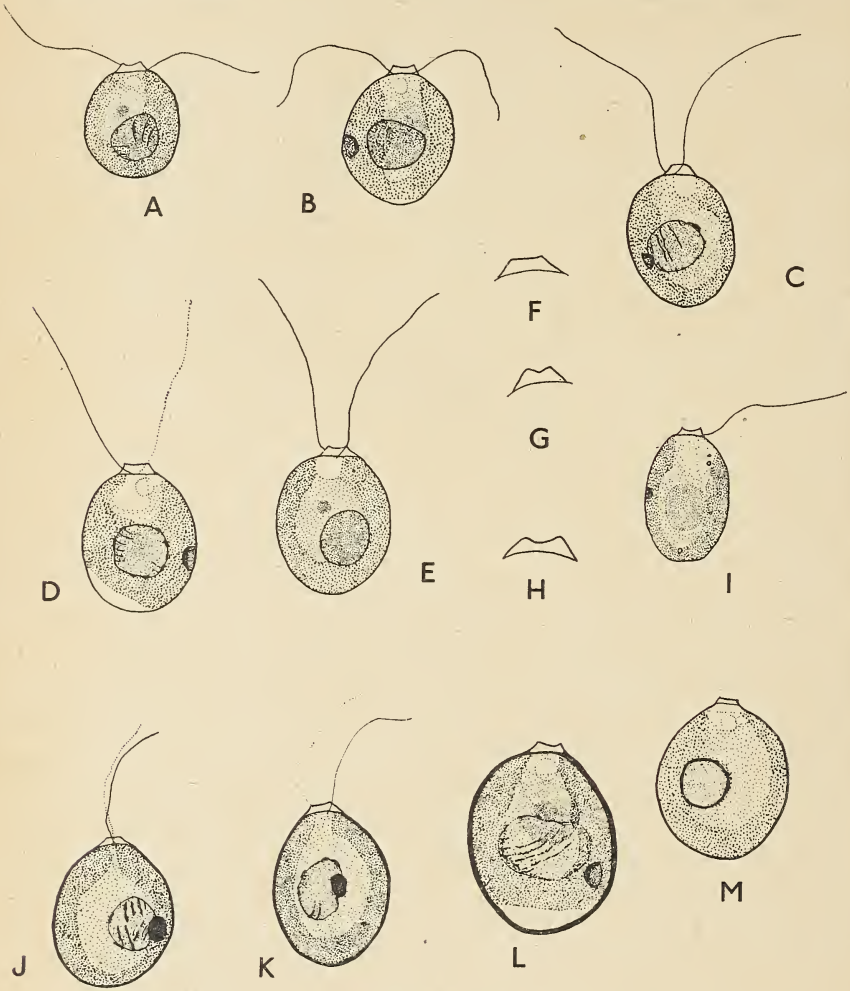


Fig. 2.

Chlamydomonas terricola Gerloff. *A-E, I-K,* motile cells ; *F-H,* papillae ; *L, M,* non-motile cells ; one flagellum lost in *I.* Cells killed in 1 per cent. osmic acid ; *F-H* × 2,150, the rest × 1,125.

humiphilos Gerloff (1940) has a papilla of similar shape to that of *C. moewusii* in this latter plane, but in the plane of the flagellae it resembles that of *C. terricola.* Apart from the shape of the papilla, cells (18-23μ 1, 10-14μ br.) of *C. humiphilos* may show a very close similarity to those of *C. terricola* (e.g. Gerloff, 1940, fig. 28, 8) but the great majority are always ellipsoid (about one and a half times as long as broad). According to Gerloff. *C. terricola* has 10 chromosomes and a centrosome ; *C. humiphilos* lacks a centrosome. It seems probable that the spirally arranged starch sheath of *C. terricola* is of diagnostic value.

VI. Little seems to be known about the distribution and ecology of *Stephanosphaera pluvialis* Cohn which is considered to be rare in Britain. There are records from England, Ireland and South Wales (I am indebted to Professor Fritsch for this record). I have observed it in a limestone bird-bath in North Wales and in several localities on the carboniferous limestone of North Yorkshire and Westmorland. Indeed, in some areas it is almost as common as *Haematococcus lacustris* which normally accompanies it. These two algae occur in small hollows in bare rock (e.g. on limestone pavement) which are intermittently filled by rainwater. When dry, the presence of the resting cells of these algae are often indicated by the reddish nature of the matter adhering to the rock, frequently with a relatively sharp upper limit indicating the water level when encystment started. Such hollows are less common in the non-calcareous rocks of the English Lake District* but an extensive search of such habitats has failed to produce a single colony of *Stephanosphaera*, though *Haematococcus* is frequently obtained. Since the former is so common in the area flanking the Lake District it seems possible that it favours calcareous rocks. Yet Pascher (1927, p. 134) states that it appears to be restricted to archaic or sandstone rocks. A sample of water containing *Stephanosphaera* was placed in a non-calcareous rock hollow outside the Freshwater Biological Association's station which has contained *Haematococcus* for the past five years. All died. To obtain more data on the distribution of *Stephanosphaera* I should be grateful for samples of water, dust or rock from such hollows irrespective of whether or not there is any indication of its presence. The best method of collection from dry hollows is to scrape the rock surface and brush the dust so obtained into a container together with that normally present in the bottom of the hollow.

It might appear that these two algae favour pure rainwater habitats, but this is not necessarily the case. Examination of some samples from Ingleborough and Malham (Yorkshire) and Beetham (Westmorland) showed that they were rich in sulphides and organic matter. Large growths of sulphur bacteria were observed. Whether the sulphur originates from the rock or the soot which comes from the industrial areas of Yorkshire and Lancashire is unknown.† Moreover, rock-hollows are frequently fouled by birds and may then have a relatively high nitrogen content.

Haematococcus tolerates even more varied habitats, occurring in places other than rock pools filled by rainwater (e.g. the spray-zone of lakes, Godward, 1937, pp. 506-7). I have observed it in more or less weakly brackish water (according to conditions) pools above high-water mark accompanied by *Brachiomonas* spp. which are common where sea spray abounds.

The chemical conditions which govern the occurrence of these two algae are then obscure. It may be that their ability to withstand prolonged drought and wide variation in the chemical composition of the water enable them to exist where most other algae cannot. It is, however, not necessary for *Haematococcus* cells to undergo intermittent drought and encystment. I have cultured them in a liquid medium for over three years and they grow as vigorously as they did originally nor is there any visible morphological alteration. Provided frequent sub-cultures are made before any large amount of haematochrome develops in the cells, encystment can apparently be prevented indefinitely.

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* The narrow strip of Coniston limestone which passes across the district has also been surveyed with negative results, but this may be due both to the scarcity of outcrops and so hollows and their frequently low content of lime.

† This sulphurous soot production is so large that even the surface of the water of Windermere may show large black patches after rain accompanied by a gentle southerly breeze.

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A YORKSHIRE RECORD OF THE AMPHIPOD *ORCHESTIA BOTTAE* (M. Edws.)

G. Fryer

The Amphipod *Orchestia bottae* (M. Edws.) belongs to that family of the order which includes the ' sand-hoppers,' namely the family Talitridae. The family has representatives which range from those occurring below the low-water mark on the seashore, through what may be termed intertidal and splash-zone forms, to those which are entirely terrestrial. It is among the latter group that *O. bottae* finds a place.

The species was not known in this country until 1942 when it was found near the River Thames at Isleworth Ferry, Richmond. Mr. D. M. Reid has kindly supplied information regarding records made since this date, these being from the River Thames at Oxford and from four localities in Norfolk. It will be noted that all these records are from the southern half of England, so it is of considerable interest to note that specimens of this Amphipod were found by the writer in March of this year near the canal in Huddersfield, the exact location being on the Huddersfield and Ashton Canal close to its junction with the Sir John Ramsden Canal.

The specimens taken occur, in the main, beneath stones at the water's edge where very damp conditions prevail, but where complete submergence is avoided. A single individual has been observed in the water, which is considerably polluted, scrambling among tangled vegetation. When the stones under which the animals shelter are lifted, the ' hoppers ' jump vigorously for other shelter in the manner characteristic for the family, or attempt to conceal themselves in any corner or crevice which is available.

Specimens live well in captivity given suitable conditions and prefer to remain out of water, though they are quite proficient swimmers and enter the water with impunity when disturbed. Feeding presents no difficulties, grass being eagerly devoured and apparently quite sufficient for their needs. The diet, however, seems to be omnivorous for the specimens feed readily on any less fortunate members of their brethren who should happen to succumb.

It seems unlikely that this one locality will be the only one in Yorkshire where *O. bottae* occurs, and it would be of interest to hear of any further records. Apart from *O. gammarella*, for which no inland records appear to exist in Yorkshire, and which in any case is not likely to be found very far inland, this is the only member of the family which is likely to be encountered away from the coast. It is therefore useful to note that members of the family are readily recognisable in the field by the hopping habit, and by the fact that, in order that this hopping can take place, they stand erect on their legs and do not move on their side as do the majority of Amphipods, *e.g.* the common *Gammarus*. Diagrams of the diagnostic features of *O. bottae* are given in Vol. 9 (Amphipodes), Chevreux & Fage's *Faune de France*, and in No. 7 of the Linnean Society's Synopsis of the British Fauna, ' Talitridae ' by D. M. Reid. The latter contains a useful key.

Thanks are due to Mr. D. M. Reid who kindly checked the identity of the Huddersfield specimens and who supplied the information referred to above regarding the distribution of *O. bottae* in Britain.

SOME OBSERVATIONS ON THE DISTRIBUTION AND MOVEMENTS OF CAVE-DWELLING BATS IN DEVONSHIRE

WINIFRED M. HOOPER, JOHN H. D. HOOPER AND TREVOR R. SHAW

Introduction

THE various natural caverns, quarry workings and disused mine adits situated throughout South Devon provide many convenient dwelling places for bats. The species most frequently found is *Rhinolophus ferrum-equinum* (Greater Horseshoe),

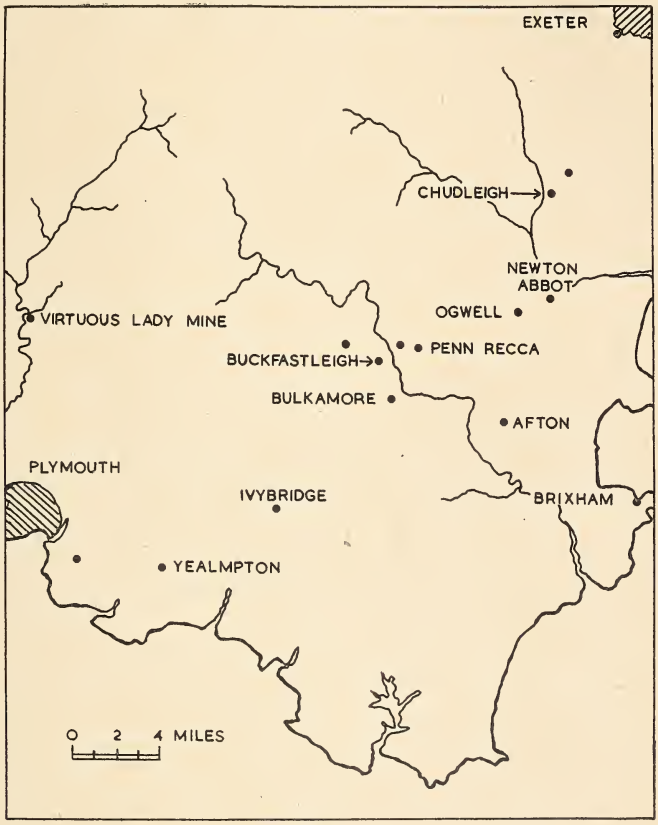

Fig. 1
Sketch map of South Devon. The black circles indicate localities where ringed bats have been handled.

but *R. hipposideros* (Lesser Horseshoe) is common and we have noted small numbers of other species, namely *Myotis nattereri* (Natterer's bat) and *Plecotus auritus* (Long-eared bat). In our observations, we have paid particular attention to the numerous limestone caves in the vicinity of Buckfastleigh (see Figure 1) and 80 per cent. of the bats which we have handled have been found in this area. We have, however, also recorded bats in caves at Chudleigh, Ogwell, Afton, Brixham and Yealmpton and in a disused copper mine (the Virtuous Lady mine) near Yelverton.

During the past two years, banding experiments have been carried out by members of the Devon Spelaeological Society in an attempt to learn something of the habits of these bats. In particular, information was sought as to their distribution and movements, their hibernatory habits and the ratio of the sexes.

It was desired to know, for example, whether certain bats showed any preference for a particular cave or group of caves, whether some bats always hibernated as individuals and others in clusters and whether the colonies showed any tendency towards segration of the sexes. The first task was, therefore, to ring and obtain detailed information on as many bats as possible : this work, carried out whenever opportunity permitted and perforce mainly at weekends, has developed in a manner far beyond our original expectation. To date (April, 1950) over 730 bats have been ringed and this figure combined with our observations on bats already ringed brings the total ' handlings ' up to approximately 1,600. A preliminary summary of this work is given in the following sections.

Banding

Banding experiments were first started, on a small scale, in December, 1947, when 37 Greater Horseshoe bats at Buckfastleigh were tagged with home-made rings which were placed round the legs. These rings, however, were of thin metal with sharp edges which tended to cause sores and their use was soon discontinued. It is thought, moreover, that the majority of the bats were able to discard them : only four bats carrying these rings were found subsequently.

In the autumn of 1948, however, a supply of aluminium rings, of the standard type used for small birds, was obtained. These rings, shaped initially like a letter 'C', are clamped loosely round the forearm of the bat, just behind the wrist. The wing membrane is not punctured. The rings are one-eighth of an inch wide and weigh approximately 0·05 grams. This is negligible compared with the weight of a Greater Horseshoe bat—normally 20-25 grams—but is rather more significant in the case of a Lesser Horseshoe, which only weighs about 5 grams. Nevertheless, they appear to carry these rings without any inconvenience. Skin sometimes tends to grow over the ring, but in general it is a healthy growth and causes no harm, although it may obscure the number on the ring. When swelling and inflammation have been noted, the ring has been removed.

The rings have been numbered consecutively and also bear the initials of the Society, namely D.S.S. These initials are sufficient identification to any regular spelaeologist who may discover a ringed bat in a cave, but unfortunately do not provide the average member of the general public with any address to which information can be sent. A difficulty however lies in providing more informative lettering within the present limited area of metal. It is felt that the rings should not be made any heavier and the use of a thinner gauge of metal to allow a larger ring would only lead to the formation of sharp edges that would harm the bat. Once a bat has gnawed its ring—a common occurrence—the present style of lettering, already quite small, becomes very difficult to read ; with smaller characters, this difficulty would be even more pronounced.

Visits to known haunts of the bats and other likely caves are made as often as possible. In winter, sleeping bats may be readily collected by hand and during the warmer months a large, long-handled net is used to collect flying specimens. In addition to ringing, measurements are made of wing span, forearm and weight and note is taken of the bat's sex, and any special features such as a damaged wing or the presence of ecto-parasites. These latter are common and include mites, the wingless fly *Nycteribia biarticulata* and the tick *Ixodes vespertilionis*. A summary of bats ringed in Devon between September 1948 and April 1950 is given in Table I.

TABLE I.

Summary of bats banded in Devon (aluminium ring on forearm)—September 1948 to April 1950.

Species	*No. of males*	*No. of females*	*Sex not determined*	*Totals*
R. ferrum-equinum	320	244	2	566
R. hipposideros	79	70	1	150
Myotis nattereri	7	3	—	10
Plecotus auritus	2	2	—	4
Pipistrellus pipistrellus ...	2	6	—	8
			TOTAL ...	738

Recoveries

Ringed bats found again—or, as they may more conveniently be described, ' refinds '—have been gratifyingly numerous, particularly in the case of *R. ferrum-equinum*. The percentage recovery for this species stands at present at 58·3 (i.e. 330 bats out of 566 ringed). Recovery in the case of *R. hipposideros* has been rather lower (28·0 per cent.) and so far none of the three remaining species handled has provided refinds. Many of the horseshoe bats have been found again several times since they were ringed. This may be seen from Table II, which summarises the refinds that have been recorded.

TABLE II

Horseshoe bats ringed in Devon (September 1948—April 1950)
Summary of ' Refinds ' recorded.

Number of times found after ringing	*Number of bats*	
	R. ferrum-equinum	*R. hipposideros*
1	330	42
2	196	14
3	128	4
4	79	—
5	41	—
6	20	—
7	9	—
8	3	—
9	2	—
10	2	—
11	1	—
12	1	—
TOTALS	812	60

The time interval between ringing a bat and finding it again varies widely and may be only a few days or several months. The first bat we ringed did not reappear for 17 months, although others handled at the same time and place were found again within a fortnight. At the other extreme was a bat which, after being ringed in one cave, was discovered in another cave, a quarter of a mile away, only three hours later. The number of unringed bats found on successive visits to the caves is slowly decreasing and, indeed, in the case of *R. ferrum-equinum*, the unringed bats are now markedly outnumbered by the ringed ones found. Thus, although out of 180 Greater Horseshoes handled in October, 1949, 100 (55·5 per cent.) were unringed, only seven new ringings (11·7 per cent.) were made among the 60 bats handled in March, 1950. It would seem, therefore, that we are dealing with a population which, although spread over a wide area, does not change much (except at the the breeding season) and there is little evidence of immigration from other districts. In the case of the Lesser Horseshoes, which are found less frequently, it is apparent that many bats still remain to be ringed. Handlings each month for this species average 15 and of this number about 10 are unringed bats.

Sex Ratio

Previous workers have often recorded a preponderance of male bats during hibernation. Griffin (1), for example, handling 3,703 *Myotis lucifugus* in ten New England caves, found that 72·5 per cent. were males. Similarly, Hitchcock (2), reports that in his observations on bats in South-eastern Ontario and adjacent Quebec, males outnumbered the females for all five species that he handled, the proportion of females ranging from 48·5 per cent. (*M. subulatus leibii*) to only 10·3 per cent. (*Pipistrellus subflavus obscurus*). Anciaux (3, 4) found a similar situation obtaining in the caves in the vicinity of Maredsous, in Belgium, with the singular exception of *R. ferrum-equinum*, for which species he noted a shortage of males.

When our own work in Devonshire began it appeared that the male Greater Horseshoes outnumbered the females by approximately two to one. Thus, out of 187 ringed in the first six months, only 63 (33·7 per cent.) were females. With the passage of time, however, the preponderance of males has decreased : it will be seen from Table I that of the 566 Greater Horseshoe bats ringed to date, 244 (i.e. 43·0 per cent.) are females. Information concerning monthly variation in male/female ratio both for new bats ringed and for total bats handled (i.e. including refinds) is given in Table III.

TABLE III

Figures showing relative numbers of male and female *R. ferrum-equinum* handled each month during the period September 1948 to March 1950.

	New ringings				*Total handled (including refinds)*			
				Per cent.				*Per cent.*
Period	*Males*	*Females*	*Total*	*Female*	*Males*	*Females*	*Total*	*Female*
1948								
September ...	15	9	24	37·5	16	10	26	38·5
October ...	2	—	2	—	2	—	2	—
November ...	7	2	9	(22)	7	2	9	(22)
December ...	20	15	35	42·9	20	16	36	44·5
1949								
January ...	41	18	59	30·5	57	32	89	36·0
February ...	39	19	58	32·8	68	36	104	34·6
March ...	59	53	112	47·2	140	94	234	40·1
April	—	1	1	—	14	5	19	26·3
May	—	—	—	—	—	—	—	—
June	2	1	3	—	6	5	11	—
July	2	2	4	—	4	6	10	—
August ...	—	—	—	—	—	—	—	—
September ...	—	1	1	—	—	1	1	—
October ...	51	49	100	49·0	85	79	164	48·1
November ...	15	12	27	44·5	51	31	82	37·8
December ...	32	41	73	56·2	86	85	171	49·7
1950								
January ...	8	5	13	38·4	48	39	87	44·8
February ...	21	12	33	36·4	54	30	84	35·7
March ...	3	2	7*	—	32	16	50*	32·0

* Total includes two bats whose sex was not determined.

Note.—In the above table, bats found more than once during a month are included once only in each total.

For the Lesser Horseshoe bats the numbers handled have been very much smaller ; nevertheless the present figures for males and females of this species (Table I) suggest a slight preponderance of the former.

Movements

The majority of the caves at Buckfastleigh are to be found beneath a single outcrop of Devonian limestone to the north of the town and, in fact, 11 caves, totalling approximately 8,000 feet of passages and chambers, lie within a few hundred yards of one another. As might be expected, numerous movements of the bats between these caves have been recorded. In addition, there are certain other cavities close to Buckfastleigh, in particular the underground slate quarries at Penn Recca (1·4 miles distant) and the disused Bulkamore iron mine (2·1 miles distant). Cross-country flights by the Greater Horseshoe bats between these localities and, to a lesser extent, to Pridhamsleigh cave (1 mile from Buckfastleigh) have been recorded so frequently that the four are now considered one area. Recorded flights between the Buckfastleigh caves and the Penn Recca quarries,

for example, now total 136. Several rather longer flights, however, have been established : typical examples are indicated in Table IV.

TABLE IV

Examples of cross-country flights recorded for Greater Horseshoe bats in Devon (1949-1950). See Figure 1.

From	*To*	*Distance (miles)*
Penn Recca slate quarry	Newton Abbot (house roof)	5·7
Yealmpton (cave)	Ivybridge (quarry)	6·5
Buckfastleigh (cave)	Berry Pomeroy (ruins), near Afton	6·5
Bulkamore (iron mine)	Ivybridge (quarry)	7·5
Penn Recca slate quarry	Ivybridge (quarry)	9·5
Penn Recca slate quarry	Chudleigh (cave)	10
Buckfastleigh (cave)	Chudleigh (cave)	11
Buckfastleigh (cave)	Yealmpton (cave)	14
Buckfastleigh (cave)	Virtuous Lady mine	17

Many of the long flights recorded have taken place in winter, i.e. during the nominal hibernation season. This may be seen from Table V, which gives a summary of flights (for *R. ferrum-equinum*) longer than 1 mile. In this table 'winter' refers to the five months November to March, which could reasonably be assumed to fall within the hibernation period.

TABLE V

Flights recorded, longer than 1 mile, for *R. ferrum-equinum* in Devon. (September 1948 to April 1950).

Distance (miles)	*Number of flights*	
	Total	*'Winter'*
1·0—2	145	78
2·1—5	44	20
5·1—10	10	2
10·1—17	8	4

It should be appreciated that in the foregoing the distances given can only represent minimum values, as it is not known how devious a course a bat may have followed between any two points. Similarly, it is not known how many stopping places may have been used on the way. Some flights are known to have taken place overnight, but in the majority of cases a week, or even several months, may have elapsed between observations. As an illustration of this, the case of bat No. 88 may be quoted. This bat, seen in a Buckfastleigh cave on March 13th, 1949, was found again in Pridhamsleigh cave, 1 mile distant, on December 10th, 1949. However, a short time later, we learned that another observer had seen this bat, on December 3rd, in a cave fully 6 miles from either location.

With regard to winter movements, Coward (5, 6) has commented on the light sleep of the Horseshoe bats, and Anciaux (3) has observed frequent interruptions in the sleep of both Rhinolophidae and Vespertilionidae in certain of the Belgian caves. In fact, the latter found that there was generally a complete renewal of the population of a cave every eight days. We ourselves have noted that during the winters of 1948-49 and 1949-50 both Greater and Lesser Horseshoe bats in Devon have hardly settled down to hibernation at all and have moved from cave to cave at almost weekly and sometimes daily intervals. It is possible that the relatively mild weather of these two winters may have influenced the movements of the Devon bats to some extent. We have not, however, yet attempted to correlate such movements with temperature—a factor whose importance has been emphasised by Guthrie (7) and also by Burbank and Young (8).

Another factor which must not be forgotten is the disturbance caused to a sleeping bat on being handled. Some bats, during ringing and measurement, become very wide awake. This applies particularly to the Greater Horseshoes, many of which struggle and bite ferociously, often drawing blood. In fact, the

comment ' Too vicious to measure ' appears against more than one bat in our records. Other individuals remain placid and sleepy and on being returned to the cave roof, settle down to apparent sleep once more. Usually, however, it will be found that even these have disappeared if the same place is visited again an hour or so later. Sometimes we have found such bats next day in another part of the same cave, or even in a different cave, a few hundred yards away. Movements like this could well be due to human disturbance, but it seems less likely that enforced awakening would cause the bat to fly, on a cold winter night, to another cave, one or more miles away, and as has already been remarked, such winter flights are by no means uncommon. At least two bats have covered the 11-mile journey from Buckfastleigh to Chudleigh between January and mid-February and the longest winter flight we have recorded for a Greater Horseshoe bat, i.e. the 14 miles between Buckfastleigh and Yealmpton, is known to have taken place between December 24th and December 29th (1949). That human interference can only have a limited effect is, in any case, suggested by the fact that on many of our winter visits to the caves, we have found Greater Horseshoe bats already on the wing, or in a wakeful state. Thus, on the evening of January 3rd (1950) we entered a cave at Buckfastleigh and discovered a cluster of about 20 Greater Horseshoe bats in a chamber 300 feet from the entrance. However, almost before we had crawled into this chamber there was considerable squeaking and chattering from these bats and many took flight before we approached. We feel, therefore, that our handling of the bats is not unduly influencing their movements : in this connection it is of interest to note that Verschuren (9), in a recent paper dealing with the winter movements of bats in Belgium, reaches a similar conclusion.

The long-distance flights of *R. ferrum-equinum* in Devon have so far suggested no pattern and merely seem to indicate general widespread movement. Nor do they tend to be in one direction only. Thus five bats have flown from Buckfastleigh to Chudleigh and two others have made the same journey in the reverse direction. Another Greater Horseshoe is known to have travelled from Buckfastleigh to a quarry near Ivybridge (8 miles) and back again during 1949.

In the case of the Lesser Horseshoe bats, comparatively few long flights have been established. Nevertheless, one such bat, ringed at Chudleigh in January, 1949, was found the following September in a garden at Exeter, approximately 8 miles away. We have also recorded 11 flights of 2 to 2·5 miles for bats of this species.

It will be noted from Table III that few observations have been made during the summer months. This is because the bats, from April onwards, leave their usual haunts and very few are then seen until a general return to the caves occurs in September and October. Some individuals apparently use the caves as summer roosts, but the bulk of the population disappears completely. An exception to this latter statement, however, occurred in July, 1949, when two ' nursing colonies ' were discovered. One was in a barn (and an adjacent cave) where many Greater Horseshoe females with their young were found. Although no accurate count could be made owing to the activity of the bats, the total was of the order of 150 and included pregnant females and an occasional male. The second colony was in the roof of an old manor house near Buckfastleigh, where Lesser Horseshoe bats (in much smaller quantity) and their young were found. This roof appeared to be a popular haunt as Greater Horseshoe, Natterer's, Pipistrelle and Long-eared bats were also found there.

General Observations

The Lesser Horseshoe bats which we have observed in Devon have almost invariably been found sleeping or hibernating individually. The Greater Horseshoe bats, on the other hand, sometimes sleep as solitary individuals and sometimes in clusters. Such clusters range in size from half a dozen members to as many as 300 : these large groups usually consist of one or more closely-packed masses with an outer fringe of more scattered individuals. In the centre the bats huddle closely together in an almost indeterminate mass and often cling to their neighbours with one foot. A typical colony containing approximately 200 bats is illustrated in Figure 2.

We find that the solitary bats sleep almost anywhere within the various caves, but when hibernating in a cluster the bats sometimes appear to show a preference

for certain definite locations. Thus in Bakers Pit Cave (Buckfastleigh), which has approximately a mile of passages, there are six hibernacula which are much favoured and are commonly used in preference to many other passages that would appear to be equally suitable. One of these haunts, in fact, would seem to have little to commend it, as it is a section of roof which streams with water after rain,

Fig. 2

Photograph showing part of a cluster of approximately 200 Greater Horseshoe bats on the roof of a cave at Buckfastleigh. This picture well illustrates the close packing of the bats in such colonies.

and the bats beneath become covered with moisture. It is thought that the bats tend to cluster together during the colder spells, but information on this point is still being sought. No tendency has been noted for a given cluster of bats to move around together, nor has it been found that some bats are always gregarious while others are always solitary in their habits. Further, although some individuals often return to the same cave many times, they are equally likely to use other caves as well. The above points are illustrated by our observations on one Greater Horseshoe bat, which has now been handled 13 times. The places where this bat has been found are listed in Table VI : with the exception of Penn Recca, which is a mean distance of 1·4 miles away, all the caves mentioned are at Buckfastleigh and lie within a radius of one-third of a mile.

TABLE VI

Summary of observations made on a Greater Horseshoe bat (No. 30), showing places where found and number of other bats present.

Date.	*Cave where found.*	*Remarks.*
November 28th, 1948	Bakers Pit cave	In ' cluster ' of two.
January 9th, 1949	Rock House cave	Solitary.
February 20th, ,,	Rift cave	Cluster of 24.
March 3rd, ,,	Spiders' Hole	Solitary.
March 13th, ,,	Rock House cave	Solitary.
March 26th, ,,	Rock House cave	Solitary.
October 1st, ,,	Joint-Mitnor cave	Cluster of 65.
October 15th, ,,	Bakers Pit cave	Cluster of 50.
October 22nd, ,,	Rift cave	Cluster of 21.
October 28th, ,,	Reed's cave	Solitary.
October 30th, ,,	Reed's cave	Solitary.
December 3rd, ,,	Penn Recca quarry	Cluster of six.
December 10th, ,,	Spiders' Hole	Solitary.

No evidence has so far been found that the Greater Horseshoe bats show any marked tendency towards segregation of the sexes on hibernation. Although it is difficult to check the sex of every bat in a large colony, as several usually escape before the count is completed, information has nevertheless been gained on sex ratio for a number of clusters at different times in the year, and this is given in Table VII.

TABLE VII

Composition of typical clusters of hibernating Greater Horseshoe bats in Devon (1949).

Date	*No. in cluster*	*No. examined*	*No. of of males*	*No. of females*
January 9th ...	17	16	7	9
February 12th ...	14	13	9	4
February 20th ...	23	23	14	9
February 20th ...	24	24	19	5
March 16th ...	82	52	27	25
October 22nd ...	21	20	14	6
December 2nd ...	30	26	8	18

It will be seen from this table that although there is considerable variation in sex ratio, in no case does anything like complete segregation occur. In fact, as already noted, we have even found males tolerated in the nursing colonies of mothers and their young and still pregnant females.

Acknowledgement

In conclusion, we should like to express our deep gratitude to all those who are making this work possible : firstly, to the many members of the Devon Spelaeological Society who have so enthusiastically devoted so much of their energy and spare time to the tedious and often uncomfortable task of searching for bats in wet and muddy caves, and secondly, to the most co-operative land-owners who have so kindly allowed us free access to their caves, quarries, barns, and even attics, to enable us to continue our observations.

Summary

During the past few years approximately 740 cave-dwelling bats (mainly *R. ferrum-equinum* and *R. hipposideros*) in South Devon have been banded with numbered aluminium rings. A high rate of recovery (58 per cent.) is being maintained for *R. ferrum-equinum* and many bats are being found again more than once. Numerous cross-country flights have been recorded for this species, including one of 17 miles. Many of these long flights have occurred during the

winter months and the evidence accumulated goes far to disprove the idea of a deep winter sleep.

Less information is available on the movements of *R. hipposideros* and the longest flight recorded for a bat of this species is only 8 miles. These bats are not so commonly found as the Greater Horseshoes, and the recovery figure for those which have been ringed is only 28 per cent.

There is some evidence that males exist in greater numbers than females for both species, but further information is required on this point. Some general observations are given on the sleeping habits of these bats and it is pointed out that when the Greater Horseshoe bats hibernate in close-packed clusters, segregation of the sexes does not occur.

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SPURN BIRD OBSERVATORY NOTES

Notes are not infrequently made at Spurn that, although valuable, are too long for use in the Y.N.U. Annual Bird Report. It is proposed in future, under the above heading, to publish separately any such notes that seem of sufficient importance. The following observation concerning the Rock Pipit's display, of which little has been published, makes a suitable example.

Communal Display of Rock Pipit

The following observations on the display of the Rock Pipit (*Anthus spinoletta petrosus*) were made by W. A. Butterfield at about 10.30 hrs. on April 6th, 1950, at a position just north of the Chalk Bank.

The day was warm with broken cloud and a light, southerly breeze.

A Pipit alighted about five yards away from the observer and was quickly joined by a second. The two ran to and fro, side by side, about a foot apart. When they stopped the first bird shivered its wings at intervals. The second's response was to adopt a peculiar posture best described as a ' wagtail ' attitude. The tail was carried horizontally and the head held high making the Pipit look like a short-tailed Wagtail.

A third bird joined the two and Nos. 2 and 3 promenaded for a few feet leaving No. 1 calling. Nos. 2 and 3 suddenly adopted the Wagtail attitude and then flew up in fight, pecking at each other and buffeting with their wings. They reached a height of about twelve feet before breaking off. The fight was vigorous enough to be heard as well as seen. While they were fighting No. 1 flew beneath them with a peculiar hovering action reminiscent of a Skylark's song flight.

Two more birds joined in, calling and promenading in the Wagtail attitude. It was now impossible to follow the movements of any individual, but the general pattern was one of haphazard fighting. One bird would run up to another, they would promenade for a few feet and then fly up in combat. On one or two occasions the approached bird retreated but then took the initiative in starting a combat flight.

At the end four birds remained and they fought in pairs. While two were fighting, one of the others flew up to about twenty feet while its erstwhile adversary remained on the ground. It then parachuted down in typical pipit song-flight with stiff wings and tail held vertically upwards to join the fourth bird. Its song was feeble and barely audible from five yards.

The display, which lasted about ten minutes, ended when all four birds flew together towards the Humber.

W. A. Butterfield.

Siskin and Tree-Creeper in July

There are times of the year when competition by ornithologists for accommodation at the Warren Cottage is keen and they cannot all be satisfied. It has been noticed that the numbers of ornithologists vary according to the number of birds expected and of the possible occurrences of rarities, based mainly upon past experience. Such expectations have been known to be wrong, and July has been a neglected month, although evidence of the turn of the migrational tide is always then interesting.

On July 8th, 1950, accompanied by Mrs. Chislett, we ran down to Spurn from the Driffield meeting of the Y.N.U., for reasons mainly connected with administration of the Observatory. We stayed until the afternoon of July 10th. Swifts and Sand-Martins were already passing south. The first Wheatears since early June were seen. Dunlins and Turnstones were there in flocks, one of which numbered *c.* 80 Dunlins and *c.* 25 Turnstones. Although the current was not strong its direction had already turned southward.

Ringing was not unprofitable, 34 birds being ringed during the two days. Captures were mainly juveniles of Linnet, Reed-bunting, Meadow-pipit, Blackbird, etc., and some running chicks of Ringed Plover and Little Tern and a brood of young Swallows. Movement of Warblers did not seem to have begun. But for a make-weight two birds were thrown in that were curious for the place and season.

Siskin. *Carduelis spinus*. With several juvenile Linnets driven into the Point trap was a juvenile Siskin. Feathers had matted over one eye. Has this species bred in Yorkshire this year, or had the bird already travelled from a northern breeding area? Even surmise is dangerous.

Tree-creeper. *Certhia familiaris*. A solitary bird in the Warren trapping-box at the end of a drive proved to be a Tree-creeper. It was a new species for the Observatory. Its upper parts were distinctly pale, although no *britannica* was available for comparison. The underparts were not pure white, but that might have been due to grime obtained from the Humberside vegetation. Sub-specific determination, however, did not seem possible.

Ralph Chislett and G. H. Ainsworth.

The Beginner's Introduction to British Gulls, Books I and II, by **Robin Harrison.** Pp. 28 with 8 plates in colour and drawings in black and white by Roland Green. Vawser and Wiles (London) Ltd., 1/6 each.

These attractive booklets are accurately described by the title and should fulfil their purpose of helping anyone to a sound knowledge of the gulls to be seen in Britain. Plumage changes from immaturity to the adult bird, and seasonal, are featured and described. The omission of references to racial forms may mislead with such a bird as the Lesser Black-backed Gull whose mantle is given as ' slate grey, much lighter than the Greater Black-backed Gull''. The darker Scandinavian form can frequently be noted in this county from autumn to late winter. Mr Roland Green's illustrations are well reproduced for such a modest price

R.C.

Happy Year, by **Anthony Buxton.** Pp. 191, with 35 photographs and 10 drawings by the author and others. Collins, 10/6.

Major Buxton dedicates his third post-war book to his family, and this must I think, include his terriers which appear so frequently as his companions among its pages. One indeed has contributed a chapter of her own. Like her master Jane is a keen fisherman and if not exactly a naturalist at least a sportswoman. The contents deal mainly with events in 1948 and cover a variety of subjects, from fishing in Norway to photographing capercaillie in Scotland. Major Buxton puts forward a new theory, based on his own observation, of the use and siting of the so-called ' Fairy rings ' made by roe-deer pairs at the rutting season. His chapters on roe have already appeared as articles in *Country Life* and he invites his readers to obtain further evidence of the validity of his theory. A concluding chapter headed ' Political ' can, so we are told, be omitted. I read it first and found it full of meat. The book is illustrated by photographs by the author and others, and by some delightful sketches of roe-deer in their rings. The photographs of birds in action are of value, if not of particular merit in themselves. Readers of his previous books will, I am sure, enjoy sharing new experiences, even at secondhand.

R.M.G.

UPLAND ECOLOGY

W. A. SLEDGE

Most of the books which have so far appeared in the New Naturalist series have an ecological background. Animals and plants are discussed in relation to their surroundings. In Professor Pearsall's book* ecology comes into the foreground. The underlying causes which lead to the occurrence of particular species and groups of species in particular habitats have always interested Professor Pearsall more than the species themselves. In this book he has described and analysed the wide variety of plant and animal communities which inhabit our mountains and moorlands. In their preface, the editors state that it is " doubtful if any other author could, single-handed, have presented such a well-balanced picture." With this judgment no one is likely to disagree, for very few naturalists know the British mountains as he does and none has studied their ecology so closely and for so long.

Professor Pearsall's account of the types of upland vegetation is preceded by a fairly detailed discussion of the geological, topographical, climatic and edaphic factors which play such an all-important part in determining the variety of communities developed. The high mountain vegetation and the grasslands, woodlands and bogs which clothe the lower slopes or the more gently undulating submontane moorlands are then described and analysed in terms of prevailing soil and weather conditions. It is clearly shown how existing types of vegetation are mostly stages in successive changes induced by natural conditions or human activities. Earlier developmental stages preceding present conditions are traced and trends towards future changes indicated.

Yorkshire and Lancashire botanists to whom the cotton-sedge moors of the Southern Pennines are so very familiar, will read with particular interest Professor Pearsall's views on the derivation of this highly distinctive type of moorland vegetation from original *Sphagnum* bog, and his arguments pointing to considerable changes which have probably taken place at a relatively recent date. To most readers this view will be something of a departure from long accepted ideas, for the absence of bog-moss and, above all, the thickness of the peat which is apparently composed throughout of the remains of *Eriophorum* have long been accepted as indicating the dominance of cotton-sedge over these moors for very great periods of time. But though the problem remains open Professor Pearsall advances cogent reasons for re-considering this view and suggests an alternative interpretation of the probable course of events.

This is but one instance of the kind of inquiry which pervades the whole book making it at once both a rich source of information and stimulation. It is packed full of original thinking. Cause and effect are constantly expounded with the accumulated wisdom of long experience and close study. It is certainly the most penetrating and illuminating general account of upland ecology in Britain ; and it is equally certain that teachers as well as students will turn to it repeatedly rather than to any text-book, for an understanding of the plant ecology of mountains and moorlands, and indeed of those broader considerations of soil and other factors affecting plant ecology in general.

But ecology is not an easy subject to write about in a manner intelligible to the lay reader. The significant plants around which descriptions of associations centre, are frequently plants with which the inexperienced amateur is not familiar ; while the complex inter-relations of climatic and soil factors and their profound biological significance are not readily appreciated by those whose outlook is not attuned to an ecological view-point. It would be idle to deny therefore that the reader without a considerable background of systematic knowledge and that awareness of habitat which, consciously or unconsciously, follows upon close and long-continued field studies, will find much of this book stiff reading. Professor Pearsall is out to instruct and not to entertain. The general reader will probably find the chapter on ecological history of special interest. Here, like a detective piecing together scattered clues and fragments of evidence to form a coherent and logical pattern of events, the story is told of how a reconstruction of long past changes in vegetation has been made from an examination of preserved fragments of plant tissues buried in peat beds or beneath the muds of lake bottoms. Of unusual interest too to the general reader is the account of animal communities and their history, which forms one of the three chapters devoted to the fauna of mountains and moorlands. The influence of the human factor on vegetation,

* **Mountains and Moorlands** by **W. H. Pearsall.** New Naturalist Series, Vol II. Pp. 312 with 47 colour and 34 monochrome photographs and 48 maps and diagrams. Collins, 21/-

operating either directly, or indirectly through animals—domesticated or preserved for sporting reasons—is a constantly recurring theme throughout the book. In the chapter on animal communities and their history a particularly interesting account is given of the successive changes in the rural economy of the population of upland Britain since historical times, with special reference to the profound effects they have had in the biological history of our mountains and moors. In the concluding chapter the breadth of the author's outlook is well shown by his balanced and thought-provoking discussion of future policy to be adopted towards our uplands in view of increasingly urgent economic considerations and the conflicting interests of conservation.

Much has been said in the foregoing paragraphs in praise of this book. Has it any defects? Reviewers are expected to find something to quarrel with; to hand out nothing but praise might be construed either as not having read the book properly or as being insufficiently competent to criticise it. (By taking an author to task for any errors they can discover, they are moreover in the happy position of being able to impress upon their readers their own familiarity with the subject, real or apparent!) Years ago I bought a copy of *Mathematics for the Million*. Initiation, I imagined, would be cheap at the price. But I soon discovered that I was not one of the particular million to which this book was addressed. Many people who buy Professor Pearsall's book, attracted by the title and the pictures will skip a good deal of it. Bogs may appear dry places to the uninitiated! As already indicated it is primarily to the knowledgeable naturalist with some ecological experience and possibly most of all to academic biologists that this book will make its strongest appeal, though there is a great deal in it to interest any intelligent reader. This of course is no defect; indeed the outstanding merit of the series is that authoritative treatment of the subject is not sacrificed to popularity of exposition. Nevertheless this is, if not the most scientific, then the most esoteric work which has so far appeared in the series.

As regards statements of fact very few faults can be found. It is affirmed that *Andromeda polifolia* is one of the species particularly sensitive to modifying agencies. Yet I have been impressed by the fact that on Thorne Moor and Hatfield Chase where draining, burning and peat digging have led to the disappearance of nearly all the rare plants of former days, *Andromeda* still survives in some quantity. It is stated on one page that *Nardus* is hardly if ever eaten by sheep, and on the next that its spread in Wales may be related to the fact that 'fewer old wethers or hill ponies now graze the hill pastures.' As a mountain plant *Silene maritima* is in my experience a plant of dry scars and block screes not of damp ledges; nor does *Ajuga pyramidalis* seem an altogether happy choice as a species especially characteristic of gill woodlands on Carboniferous limestones. The very few other statements of a like kind I leave to other reviewers to pontificate about. To pick on these in such a book would be as profitable as picking midges off an elephant.

This is a powerful piece of work which will certainly enhance the already high prestige of the series. By writing it Professor Pearsall has rendered a most valuable service to all serious students of British natural history. If one may end on a personal note, it has incidentally given immense pleasure to one who, over a period of more than twenty years, has been priviledged to join in so many of the excursions which have led to its creation.

***Luronium* (*Alisma*) *natans* (L.) Raf., at Slaithwaite.**—An area of at least 60 square yards occupied by this plant was discovered in flower near the intake of the reservoir at Hill Top, Slaithwaite, near Huddersfield on 21st July, 1950. As only two very doubtful Yorkshire records of this plant exist—namely Semerwater and Hornsea Mere—this find establishes the species as a member of the county flora. As the area occupied indicates, the plant was well established, and flowers were present in profusion. A small patch of the plant in another part of the reservoir was probably derived from the main clump.

Dr. Sledge informs me that *A. natans* is to be found in the canal at Littleborough in Lancashire, but does not extend into Yorkshire along this waterway. The Littleborough locality is apparently the nearest to the present situation where the plant is to be found. Enquiries made by Mr. J. Duce and myself indicate that the plant has not been introduced, and that it has arrived at Slaithwaite through natural agencies.—G. Fryer.

THE SPRING FORAY AT MASHAM
April 14th-17th, 1950

W. G. BRAMLEY

A SMALL party of seven members assembled for the 1950 Spring Foray and, while most of the county suffered from rain and snow, were favoured for the most part with fine and warm conditions. Setting out for Hackfall on the Friday in a slight drizzle, which abated by noon, a good day's collecting was enjoyed. The following day, again under the able guidance of Mr. W. Thwaites, Swinton Park was explored, and the results fully came up to the autumn visits in previous years. Sunday morning was spent in pottering about amongst butterbur and *Spiraea* beds on the recreation ground. Owing to some tidying up, this ground did not prove so fruitful as formerly. A welcome lift by car from our ex-President, Mr. Chislett, in the afternoon, took the remaining four members the four miles to Quarry Gill, new ground to all but the writer, where a fruitful four or five hours were spent amongst the fallen logs.

It is many years now since much interest was taken in lichens, but one of the party, Mr. C. F. Rimington, devoted his two-day visit to the study of this group and a short list of some of the more interesting is appended. As will be seen he covered considerably more country than the rest of the party.

The writer is indebted to Messrs. Webster and S. J. Hughes for lists of the material they collected, to Miss Wakefield and Dr. Dennis of Kew for the trouble they have taken to identify specimens sent by him, and to Mr. A. C. Collinge for the list of Myxomycetes.

A number of specimens are (at the time of writing) still under consideration. Specimens are disposed in the following Herbaria and are indicated :

C. = In Herb. Commonwealth Mycological Institute.
S. = ,, University of Sheffield.
K. = ,, Royal Botanic Gardens, Kew.
Yk. = ,, Yorkshire Museum, York.

Accession numbers are given where applicable. Only one reference is given, preference being given to those collections deposited in Yorkshire.

H. = Hackfall. S. = Swinton.
Q. = Quarry Ghyll. M. = Masham.
* Not listed for V.C.64. † Not in Mason & Grainger.

MYXOMYCETES

Arcyria denudata Wetts., 61.
A. ferruginea Sauter, 60.
Comatricha nigra Schroet., 62.
Cribraria rufa Rost., 55.
**Diderma floriforme* Pers., 58.
†*D. montana* var. *album* G. Lister, 57.
**D. radiatum* Morg., 59.
Reticularia lycoperdon Bull., 56.
Trichia affinis de Bary, 46.
T. botrytis Pers., 47.
†*T. botrytis* var. *munda* Lister, 48.
T. contorta Rost., 49.
T. decipiens Macbr., 50.
T. favoginea Pers., 51.
**T. lutescens* Lister, 52.
T. persimilis Karst., 53.
T. varia Pers., 54.

All in Herb. A. C. Collinge.

PHYCOMYCETES

Peronospora ficariae Tul., on *Ficaria verna*, M. S348.
**Plasmopara pygmaea* (Unger) Schroet., on *Anemone*, H.

DISCOMYCETES

Aleuria ampliata (Pers.) Gill., on *Ulmus*, S.
†*Arachnopeziza aurata* Fuckel, on *Quercus*, H. C40689.
Belonopsis pilosa (Cross) Rehm, on *Carex* sp., H. (Det. & in herb. W. D. Graddon).
†*Dasyscypha brevipila* le Gal., on *Fagus*, S. Yk.
†*D. cerina* (Pers. ex Fr.) Fuckel, on *Fagus*, S. C40627.
**D. grevillei* (Berk.) Massee, on *Arctium*, Q. C40777.
D. nivea (Hedw. ex Fr.) Sacc., on *Quercus*, H.
D. virginea (Batsch) Fuckel, on *Rubus*, S. Yk.
†*Durella commutata* Fuckel, on *Fagus*, S. Yk.

DISCOMYCETES—*continued*

**Hyaloscypha leuconica* (Cke.) Nannf., on *Fagus*, S. C40607.
Morchella esculenta (Linn.) Pers., S.
**Orbilia luteo-rubella* (Nyl.) Karst., on wood and bark, S. C40681.
O. xanthostigma Fr., on *Alnus*, H. C40656.
Phialea cyathoidea (Bull.) Gill., on *Arctium*, S. C40774.
**Propolis faginea* (Schrad.) Karst., on *Fagus*, Q. S330.
†*P. versicolor* Fr., on *Fraxinus*, H. C40562(a).
Rhizina inflata (Schaeff.) Karst., H. Yk.
Sclerotinia curreyana (Berk.) Karst., on *Juncus*, H. S331.
Trichoscyphella Tax. Sp. 1 (Dennis, Rev. Br. Hyaloscyphaceae *Mycol. Pap., C.M.I.*) (=*Dasyscypha calycina* (Schum.) Fuckel) on *Larix*, H. S330.

PYRENOMYCETES

†*Acrospermum compressum* Tode ex Fr., on *Urtica*, Q. C40960.
†*Anthostoma gastrinum* (Fr.) Sacc., on *Ulmus*, S. Yk.
Bertia moriformis (Tode ex Fr.) de Not., on *Aesculus*, S. S298 ; on *Fagus*, S. S275 ; on *Fraxinus*, H. S284.
**Berlesiella nigerrima* (Blox. ex Curr.) Sacc., on *Diatrype stigma* on *Acer*, Q. Yk.
**Calospora platanoides* (Pers.) Niessl, on *Acer*, Q. S326.
†*Cephalotheca purpurea* (Shear) Chesters, on *Fagus*, S. C40610(b).
**Ceratostomella ampullasca* (Cooke) Sacc., on *Fraxinus*, Q. C40551.
†*Chaetomium olivaceum* Cooke, on *Typha*, S. Yk. S313.
†*Chaetosphaeria cupulifera* (Berk. & Br.) Sacc., on *Fraxinus*, H. C40550(a).
C. phaeostroma (Dur. & Mont.) Fuckel, on *Acer*, S. S292, Q. S293 ; on *Alnus*, H. S297 ; on *Fagus*, Q. S294.
†*Cryptodiaporthe hranicensis* (Petr.) Wehm., on *Tilia*. Yk.
**Cryptospora suffusa* (Fr.) Tul., on *Alnus*, H. S283.
Daldinia concentrica (Bolt.) Ces. & de Not., on *Fraxinus*, H.
Dialonectria sanguinea (Bolt. ex Fr.) Cooke, on *Diatrype stigma* ,Q. S304.
†*Diaporthe arctii* (Lasch.) Nits., on *Arctium*, H. C40687.
**D. leiphaemia* (Fr.) Sacc., on *Quercus*, S. C40741.
Diatrype disciformis (Hoffm. ex Fr.) Fr., on *Fagus*, S. S287.
D. stigma (Hoffm. ex Fr.) Fr., on *Fagus*, S. S288 ; Q. S289.
Diatrypella favacea (Fr.) Ces. & de Not., on *Betula*, H. S285 ; on *Fagus*, Q. S286.
**Didymella tosta* (Berk. & Br.) Sacc., on *Epilobium*, H. S273.
†*Eutype flavovirens* (Pers. ex Fr.) Tul., on *Fagus*, S. S307 ; Q. S308.
†*Eutypella stellulata* (Fr.) Sacc., on *Ulmus*, Q. C40664.
†*Farlowiella carmichaeliana* (Berk.) Sacc., on *Quercus*, H. S300 ; on *Fagus*, Q. S301.
†*Hercospora tiliae* (Pers. ex Fr.) Fr. emend. Tul. (stat. con.), on *Tilia*, H. S314.
Hypocrea pulvinata Fuckel, on *Polyporus betulinus*, H. S312.
Hypoxylon fuscum (Pers. ex Fr.) Fr., on *Corylus*, S. S290.
H. coccineum Bull., on *Fagus*, Q.
H. multiforme (Fr.) Fr., on *Acer*, H. S277 ; on *Aesculus*, S. S276 ; on *Betula*, Q. S278 ; on *Fagus*, Q. S279.
H. rubiginosum (Pers. ex Fr.) Fr., on *Fraxinus*, Q. S282.
H. serpens (Pers. ex Fr.) Fr., on *Fagus*, S. S280 ; on Conifer, H. S281.
†*Hysterium angustatum* (Alb. & Schw. ex Fr.) Chev., on *Ulmus*, S. S299.
Lasiosphaeria ovina (Pers. ex Fr.) Ces. & de Not., on *Aesculus*, S. S311 ; on *Ulmus*, S. S310.
L. spermoides (Hoffm. ex Fr.) Ces. & de Not., on *Fagus*, S. S272 ; on *Fraxinus*, H. S291.
†*L. strigosa* (Alb. & Schw. ex Fr.) Sacc., on *Fagus*, S. S327 ; on *Ulmus*, S. S328.
Leptosphaeria acuta (Moug. & Nestl.) Karst., on *Urtica*, H.
†*Massarina eburnea* (Tul.) Sacc., on *Fagus*, Ellerstring. C40612.
Melanomma pulvis-pyrius (Pers. ex Fr.) Fuckel, on *Corylus*, S. S316.
†*M. subdispersum* (Karst.) Berl. & Vogl. (stat. con.), on *Betula*, Q. C40536(a).
Nectria cinnabarina (Tode) Fr., on *Fagus*, S.
**Ophiobolus acuminatus* (Sow. ex Fr.) Duby, on *Cirsium*, M. S315.
†*O. herpotrichus* (Fr.) Sacc., on wheat stubble, M. S359.
Pleospora herbarum (Pers. ex Fr.) Rabenh., on *Trifolium*, H. S274.
†*P. infectoria* Fuckel, on wheat stubble, M. S357.

PYRENOMYCETES—*continued*

Quaternaria dissepta (Fr.) Tul., on *Ulmus*, M. S296.
Q. quaternata (Pers. ex Fr.) Schroet., on *Fagus*, S. S295.
Rhopographus filicinus (Fr.) Fuckel, on *Pteridium*, H. C40781(a).
†*Sillia ferruginea* (Pers. ex Fr.) Karst., on *Corylus*, H. S306.
Trichosphaeria myriocarpa (Fr.) Petr. & Syd., on *Ulmus*, S. S317.
Xylaria carpophila (Pers. ex Fr.) Fr. (conidial), on *Fagus* cupules, S. Yk.
X. hypoxylon (Linn. ex Fr.) Grev., on *Fagus*, Q. S305.
X. longipes Nits., on *Acer*, Q.

BASIDIOMYCETES

UREDINALES

Puccinia caricis (Schum.) Reb., O,I on *Urtica*, H ; III on *Carex hirta*, H ; on *Carex pendula*, H. S346.
P. fusca Wint., on *Anemone*, H.
P. pimpinellae Mart., O,I on *P. magna*, S.
P. tumida Grev., on *Conopodium*, H.
Uromyces ficariae (Schum.) Lev., on *F. verna*, H.
U. poae Rabenh., O,I on *F. verna*, H. S.
U. scillarum (Grev.) Wint., on *Scilla*, H. S347.

USTILAGINALES

Urocystis anemones (Pers.) Wint., on *Anemone*, H.

AGARICALES

Collybia velutipes (Curt.) Fr., S.
Coprinus micaceus (Bull.) Fr., S.
Pluteus cervinus (Schaeff.) Fr., S.
Psalliota arvensis (Schaeff.) Fr., H.
Stropharia aeruginosa (Curt.) Fr., H., S.
Tubaria furfuracea (Pers.) W. G. Sm., S.

APHYLLOPHORALES

Acia uda (Fr.) Bourd. & Galz., S.
Daedalia quercina (Linn.) Fr., H. C40917, very abundant.
Polyporus adustus (Willd.) Fr. on *Larix*, H., covering the underside for many feet.
P. caesius (Schrad.) Fr., Q.
P. radiatus (Sow.) Fr., on *Alnus*, H., Q.
Fomes annosus Fr., on *Larix*, Q.
**Poria purpurea* Fr., on *Fagus*, S., K.
P. reticulata Pers. (=*farinella* Fr.) on *Fagus* and *Ulmus*, S. Yk.
†*Solenia stipitata* Fuckel, on *Sorbus*, S. C40653(b).
Stereum spadiceum Fr., H.
†*Helicobasidium purpureum* Pat., H. Yk.
Hymenochaete rubiginosa (Dicks.) Lev., on *Quercus*, H.
Mycoleptodon fimbriatum (Pers.) Bourd., on *Fagus* and *Arctium*, Q. Yk.
Odontia papillosa (Fr.) Bres., S. C40786.
Corticium comedens (Nees) Fr., on *Fagus*, Q. Yk.
C. confine Bourd. & Galz., on *Sambucus*, H. C40679.
†*C. fuscostratum* Burt. (=*ochroleucum* Bres.), on *Betula*, Q. Yk.
†*C.* (*Gleo*) *pallidum* Bres., on *Fagus*, Q. Yk.
C. sambuci (Pers.) Fr., on *Sambucus*, H. Yk.
Peniophora cinerea (Fr.) Cooke, on *Fagus*, S. ; on *Fraxinus*, H.
P. gigantea (Fr.) Mass., on *Larix*, H.
P. hydnoides Cooke & Mass., on *Quercus*, Q. Yk.
P. incarnata (Pers.) Cooke, on *Corylus*, S. Yk.
**P. laevigata* (Fr.) Mass., on conifer, H. Yk.
**P. pallidula* Bres., on *Abies*, Q. Yk. ; on *Larix*, Q. Yk.
P. pubera (Fr.) Sacc., on *Fraxinus*, H. C40552.
†*Pellicularia pruiniata* (Bres.) Rogers (conidial), on *Fagus*, Q. C40604.
P. subcoronata (von Höhn. & Litsch.) Rogers, Q.
**P. vaga* (B. & C.) Rogers (=*Corticium botryosum* Bres.), on conifer, H. Yk.

AURICULARIALES

Auricularia auricula-judae (Linn.) Schroet., on *Euonymus* and *Sambucus*, H.

TREMELLALES

Exidia glandulosa (Bull.) Fr., S.
Tremella albida (Huds.) Fr., on *Crataegus*, H. K.
T. mesenterica (Retz.) Fr., on *Fagus* and *Fraxinus*, S.

FUNGI IMPERFECTI

COELOMYCETES

Phoma macrocapsa Trail, on *Mercurialis*, H., S.
P. samarum Desm., on *Fraxinus* fruits, H. S342.
Phomopsis scobina von Höhn., on *Fraxinus* twigs, Ellerstring. C40561.

HYPHOMYCETES

Bactridium flavum Kunze, on *Populus*, M. S341.
Brachysporium apicale (Berk. & Br.) Sacc., on *Fraxinus*, H. C40555.
**B. obovatum* (Berk.) Sacc., on *Fagus*. C40631(e).
†*Catenularia cuneiformis* (Richon) Mason, on *Fraxinus*, H. C40557.
†*Clasterosporium fasciculare* (Corda) Sacc., on *Alnus*, H. S338.
†*Diplococcium spicatum* Grove, on *Betula*, Q. C40536(b).
†*Exosporium tiliae* Link ex Wallr., on *Tilia*, H. S334.
†*Helminthosporium macilentum* Cooke, on *Sorbus*, S. C40653(c).
†*H. simplex* Kunze ex Fr., on *Ulmus*, S. S337.
**H. tingens* Cooke, on *Quercus*, S. C40682.
†*H. turbinatum* Berk. & Br., on *Sambucus*, H. C40673.
†*Menisporia caesia* Preuss, on *Quercus*, H. C40740.
M. ciliata Corda, on *Quercus*, H. C40692.
†*M. tortuosa* Corda, on *Fagus*, S. S340.
Monilia aurea auct., on *Diatrype stigma* on *Fagus*, S. C40629.
†*Oidium conspersum* (Link.) Linder, on *Fraxinus*, H. S332.
Ovularia obliqua (Cooke) Sacc., on *Rumex*, H. S333.
†*Sarcopodium circinatum* Ehrenb., on *Arctium*, H. C40784(a).
†*Septocylindrium pallidum* Grove, on *Diatrype stigma* on *Fraxinus*, Q. C40545.
**Stachylidium cyclosporum* Grove, on *Quercus*, H. S335 ; on *Ulmus*, S. S336.
†*Speira toruloides* Corda, on *Sorbus*, S. C40653(h).
**Sporocybe flexuosa* (Mass.) Mason, on *Betula*, H. C40537.
†*Torula gyrosa* Cooke & Mass., on Conifer, Q. S339.
T. herbarum (Pers.) Link ex Fr., on wheat stubble, M. S358.
†*T. hysteriodes* Corda, on *Fagus*, S. C40630(c).
T. ovalispora Berk., on *Fraxinus*, H. C40562(b).
Trichothecium roseum (Pers.) Link., on *Arctium*, S. C40779.
**Triposporium elegans* Corda, on *Fagus*, S. C40631(a).
†*Virgaria nigra* Nees ex Berk., on *Sorbus*, S. C40653(g).

LICHENS

(C. F. Rimington)

In addition to the ubiquitous species expected and duly found, the following species were collected. The recorder is most grateful to Dr. W. Watson for his help in identifying and confirming these records.

H.=Hackfall. J.=Jervaux. M.=Masham.

Biatora immersa (Web.) Sydow, common on limestone, H., J., M.
B. lucida (Ach.) Frm., one record on limestone, H.
Caloplaca ferruginea var. *festivum* (Ach.) Mudd, fine specimens on limestone, J.
Collema cheileum Ach., common on mortar and limestone, J.
C. granuliferum Nyl., common on moss and limestone, J.
Graphis ramificans Nyl., on ash (usually on holly), M.
G. scripta (L.) Ach., with the black stalks of the lichen *Stenocybe septata* (Leight.) Rehm parasitic upon it, J.
Lecidea viridans (Flot.) Krb., on limestone, J.
Opegrapha saxicola Ach., on siliceous rock, M.
Peltigera rufescens and its var. *praetextata* (Flk.) Nyl., abundant among moss, H.
Placynthium nigrum (Huds.) Gray, common on limestone, M., J.
Physcia aipolia (Ach.) Nyl., frequent on ash and oak, M., J.
Xanthoria lychnea (Ach.) Th. Fr., on limestone, sterile as usual, M.

YORKSHIRE NATURALISTS' UNION EXCURSIONS IN 1950

MALTON, May 27th-29th

The task of arranging a long weekend meeting has become more and more difficult with the steep rise in the cost of accommodation and transit. When the Union decided to hold the Whitsuntide meeting at Malton it did so thinking that accommodation would not be difficult, and that the district held ample scope for natural history field work; but it was only by our Divisional Secretary's, persistent exertions that accommodation was secured, and this at a heavy price.

The three areas visited were pleasantly varied. Terrington Carr was sadly altered from its old time state. Recent drainage and the dry spell of weather made it almost impossible to get wet feet short of falling into the ditches, yet within the last twenty years it was scarcely possible to cross the same area dryshod. The lake at Castle Howard appears to be a holiday bathing resort for Malton folk. The dry year had not altered the depth of water, but the quarries, worked by older botanists for mosses, were much too dry for these plants. On Monday the visit to North Grimston took us to a quite different type of country, to end a pleasant weekend.

At the meeting the members expressed their thanks to the landowners for the permission given to visit the various estates, and also to our Divisional Secretary Kenneth G. Payne for the trouble he had taken to arrange this meeting.

Ornithology (Ralph Chislett): The terrain included the rough, wooded Terrington Carr (of which the centre is now cultivated), the Castle Howard lake and woods, and some of the woodlands of the Birdsall Estate, explored from North Grimston. Seventy-six species were identified during the week-end.

The Castle Howard lake provided several species not seen elsewhere, such as Coot (nests seen), Water-Rail (one heard 'sharming'), Great Crested Grebe (three pairs nesting), Little Grebe (one pair), Tufted Duck, Black-headed Gull, and an immature larger Gull, two or three Reed-Warblers, and a number of Sedge-Warblers and Reed Buntings. A pair of Nuthatches and several singing Pied Flycatchers were in trees not far from the lake. Garden Warblers, Blackcaps, and Whitethroats were in fair numbers and were noted on all three days (Chiffchaffs were scarce). Other species seen every day were Carrion Crow, Rook, Jackdaw, Jay (once each day), Starling, Yellow-Bunting, Chaffinch (abundant), Tree-Pipit (not very vocal), Tree-Creeper, Great (nest), Blue (nest), Coal and Marsh Tits, Willow-Warbler, Thrush and Blackbird, Redstart, Robin (nest), Hedge-Sparrow (nest with Cuckoo's egg), Wren (abundant), Swift, Great-Spotted Woodpecker, Sparrow-Hawk (once each day), Woodpigeon, Stock-Dove and Pheasant. Turtle Doves were only noted in the Wold's woods. The Green Woodpecker was scarce except near North Grimston where a nesting-hole was found. Magpies and Lesser Redpolls were scarce and Tree-Sparrows and Whinchats were only noted in the Wold area. Two nests of Long-tailed Tits were seen at Castle Howard. Spotted Flycatchers were few, and Mistle-Thrushes were scarce. Swallows were much fewer than House-Martins. Little and Tawny Owls were noted, a young Tawny being ringed. Seventy-five Mallard were counted on the lake mostly drakes, and a duck arose from a brood. A Mute Swan incubated with her mate nearby, and three younger birds swam together.

Other species seen were Greenfinch, Linnet, Bullfinch, Skylark, Meadow-Pipit (scarce), Pied Wagtail (scarce), Goldcrest, Wood-Warbler (scarce), Sand-Martin, Kestrel, Heron, Lapwing, Woodcock, Moorhen (several nests), and Common Partridge. Goldfinch and Sandpiper were only noted near Malton. The Settrington woods, mentioned in the circular, were not explored.

Conchology (Mrs. E. Morehouse): Terrington Carr and the adjacent woods were not profitable in their molluscan fauna, but about the lake on the Castle Howard Estate, there was a fair number of molluscs. North Grimston also yielded some of the larger helices brought in by members while the writer of these notes went to another area. The species listed below were taken at the following stations:

Terrington Carr, 1. Castle Howard Lake and the surrounding land and woods, 2. Pickering Quarry, 3. Oldstead, 4. North Grimston, 5.

Pyramidula rotundata Müll. 2, 5,
Vitrea pura Alder 2.
V. alliaria Mill. 2.
V. cellaria Müll. 2, 5.
V. nitidula Drap. 2.
Helix nemoralis L. 5.
H. nemoralis v. *carnea* 2.
H. nemoralis v. *rubella* Picard 5.
H. hortensis Müll. type 5.
H. hortensis v. *lutea* Moq-Tan. 5
H. hortensis v. *albina* Moq-Tan. 5.
H. hortensis v. *philbertia* Moq-Tan. (23)45 5.
H. hortensis v. *bouchardia* Moq-Tan. (12345)5.
H. aspersa Müll. 2, 4.
Arianta arbustorum L. 2, 5.
Clausilia laminata Montagu 2.
Clausilia bidentata Ström. 2.
Cochlicopa lubrica Müll. 2.
Hygromia rufescens Penn. 5.
H. rufescens v. *alba* Moq-Tan. 5.
H. hispida L. 2.
H. granulata Alder 2, 3.
Helicella itala L. 3, 5.
Theba cantiana Montagu 5.
Econulus fulvus Müll. 2.
Carychium minimum Müll. 2.
Zonitoides nitidus Müll. 2.
Arion ater L. 1, 2.
A. ater v. *brunnea* Roebuck 1.
Agriolimax agrestis L. 2.
Limax maximus L. 2.
Bithynia tentaculata L. 2.
Planorbis spirorbis L. 2.
Succinea sp. 2.
Anodonta cygnaea L. 2.

Helix aspersa Müll. was found on *Helleborus foetidus* L. Miss Rob and a friend saw it feeding on the plant a few weeks earlier.

Diptera (C. A. Cheetham) : Mr. K. G. Payne sends the following lists of species he noted during the meeting. These are additional to those taken by me which follow.

Terrington Carr.

Tipula luna Westhoff., *T. variipennis* Mg., *T. variicornis* Schum., *Limnophila maculata* Mg., *L. tripunctata* F., *L. meigeni* Verral. (=*nigrina* Mg.), *Dicranomyia mitis* Mg.

Castle Howard Park.

Pales maculata Mg., *Tipula lunata* L., *T. luna* Westhoff., *T. variipennis* Mg., *T. hortulana* Mg., *T. lateralis* Mg., *Limnobia tripunctata* F., *L. nubeculosa* Mg., *Tricyphona immaculata* Mg. (common), *Rhipidia maculata* Mg., *Ula sylvatica* Mg., *Ptychoptera contaminata* L., *P. albimana* Fab., *P. lacustris* Mg.

North Grimston.

Tipula maxima Poda., *T. oleracea* L., *T. vernalis* Mg., *Ctenophora pectinicornis* L. ♀ was taken by Mr. R. Lewis in Lund Wood and appears to be the first record for V.C. 61., *Limnobia tripunctata* F., *Dicranomyia didyma* Mg. (a number were sitting inside a culvert on the little stream), *Erioptera trivialis* Mg., *Ptychoptera paludosa* Mg.

The most interesting species of diptera at Terrington were *Hexatoma* (*Peronocera*) *fuscipennis* Curt., *Dactylolabis transversa* Mg. (*gracilipes* Lw.), *Ctenophora flaveolata* F., and the mosquito *Aëdes* (*Ochlerotatus*) *annulipes* Mg. Other species taken here are *Limnophila* (*Poecilostola*) *punctata* Schr., *Bibio marci* L., *B. leucopterus* Mg., *B. lepidus* Lw., and *Dryomyza flaveola* F.

At Castle Howard *Aedes annulipes* Mg. occurred again in quantity, also *Anopheles bifurcatus* L., *Corethra plumicornis* F., *Chironomus plumosus* L., the above-noted *Bibios*, *Limnophila ferruginea* Mg., *Chilosia variabilis* Pz., *Baccha elongata* F., *Xylophagus ater* F., *Beris morrisii* Dale, *Parallelomma albipes* Fal., *Empis livida* L., and *tesselata* F.

At North Grimston (V.C. 61) *Ptilonota guttata* Mg., *Limnophila dispar* Mg., *Empis stercorea* L., *trigramma* Mg., and *livida* L.

Freshwater Biology (H. Whitehead) : Mr. Cheetham and I joined forces for the three days. Cold wind in the morning followed by rain later in the day during our visit to Terrington Carr on Saturday, May 27th, kept the winged insects down and only two species (Stoneflies) were taken by sweeping—*Leuctra hippopus* Kpny. and several *Nemurella inconspicua* (Pict.). A few caddis larvae were taken from a small stream flowing through the Carr.

At Castle Howard (May 28th) the whole day was spent on the banks of the lake.

There were very few insects flying in the morning owing to a strong cold wind. Later the wind died down and the sheltered south end of the lake yielded a number of Mayflies—*Cloeon simile* Etn. A few males and females of the Common Blue Damsel-fly (*Enallagma cyathigerum* (Chap.)) were flying over reeds in a dried-up pool. Mr. K. G. Payne took a nice specimen of *Phryganea striata* L., ♂ and the only other caddises seen on the wing were *Lemnophilus auricula* Curt. (♂) and *Tinodes waeneri* L. (♂). The submerged stones at one part of the lake had large numbers of pupal cases of a caddis attached to them. Specimens were taken home and about a week later the imagoes emerged and were identified as *Athripsodes* (*Leptocerus*) *aterrimus* (Steph.). *Nemurella inconspicua* (Pict.) was common.

A sample of plankton was taken but this has not yet been examined.

North Grimston (May 29th). A fine day spent mostly in examining the banks and bed of a clear swift stream running parallel to the railway and later passing through the village. The area was sheltered and caddis on the wing were *Lemnophilus auricula* Curt. ♂, *Hydropsyche angustipennis* Curt. ♂, *Silo pallipes* F. ♂. Larvae of *Rhyacophila* were taken and also a number of pupal cases of *Hydroptila*. These were in a cluster attached to a filamentous alga. Specimens yielded several imagoes which Mr. D. E. Kimmins of the Natural History Museum kindly identified. The majority were *H. maclachlani* Klap.♂♂♀♀ and one ♀ of *H. forcipata* Etn. Three species of Ephemeroptera were identified—*Paraleptophlebia submarginata* (Steph.) ♂, *Ecdyonurus venosus* (Fabr.), ♂ subimago and a nymph of *Rhithrogena semicolorata* (Curt.). Only one species of Plecoptera was seen—*Nemoura cambrica* Steph. ♂♂. Mrs. Appleyard saw a Crayfish higher up the stream.

Several ponds were visited in a field to the south of the stream. One of these, rich in various forms of life, contained a species of Turbellarian worm, *Tetracelis marmorosa* (Müll.) so far not recorded from the county.

Flowering Plants (C. M. Rob) : The Malton district has been so well worked in the past that new records were not to be expected and the main job of the botanical section was to see just what is left after the extensive drainage and agricultural operations that have taken place in recent years.

So far as Terrington Carr is concerned the results were depressing, very little really wet ground remains and almost all the special plants have gone ; even *Drosera longifolia* L. which was seen two years ago could not be found. *D. rotundifolia* L. still lingers on but in less quantity, *Viola palustris* L. and *Carex lasiocarpa* Ehrh. remain, the latter not flowering. The alien *Alnus incana* (L.) Moench was seen, also *Salix repens* L. and *Pyrola minor* L. *Ornithopus perpusillus* L. was in sandy ground nearby.

Convallaria majalis L. in Cum Hagg Wood appears to have increased since the trees were felled.

The visit to Castle Howard on Sunday was more fruitful. *Acorus Calamus* L. has spread considerably since the Union's last visit and now occurs along most of the shore of the big lake. *Pilularia globulifera* L., which was plentiful on the muddy west shore two years ago, was not found in spite of a prolonged search. *Potamogeton alpinus* Balb. and *Ranunculus circinatus* Sibth. have gone from the obelisk ponds.

By the South Lake and its overflow ponds the following plants were seen : *Alnus incana* (L.) Moench, *Carex pendula* L., *Geranium sylvaticum* L., *Typha angustifolia* L. and *Hippuris vulgaris* L. As this area was part of the pleasure grounds of the Castle, some of the plants may be introduced, but now are well established.

Poa nemoralis L. was abundant under the limes in the Broad Walk as was a form of *Saxifraga granulata* L. with very large double flowers. *Anchusa sempervirens* L. was plentiful in some parts of the grounds.

Other plants seen on this excursion were *Carex vesicaria* L., *C. rostrata* Stokes, *C. acuta* L. and *Geranium pyrenaicum* Burm. f., the last named being noted near North Grimston and in a disused quarry near Malton.

The excursion on Monday to North Grimston and Wharram was particularly interesting. *Ranunculus parviflorus* L. was plentiful in the old chalk pits, also in one seed field near Wharram. This field also provided the most interesting plant seen during the whole excursion, a single plant of *Alyssum alyssoides* (L.) L. The plant was reported from this field more than sixty years ago by the late Rev. G. H. Chilman. Repeated searches have since been made, all unsuccessful, so

its reappearance after so long is particularly pleasing. *Fumaria parviflora* Lam., *Specularia hybrida* (L.) A.DC., *Valerianella dentata* (L.) Poll., *Cerastium arvense* L. and *Anthriscus scandicina* (Weber) Mansf. were seen in the chalk pits and adjacent arable fields. *Catabrosa aquatica* (L.) Beauv. was plentiful in the stream near Wharram.

The walls of Old Malton Priory had a number of plants of *Diplotaxis tenuifolia* (L.) DC. growing upon them.

Bryophyta (Mr. A. Thompson) : Only four kinds of *Sphagna* were collected during the three days and these were all from Terrington Carr. They were *S. fimbriatum* Wils. var. *laxifolium* Warnst., abundant, *S. fallax* Klingg. var. *laxifolium* Warnst., *S. crassicladum* Warnst. var. *magnifolium* Warnst. from one of the few ditches not dried up, and much *S. cymbifolium* Ehrh.

In 1938 when I paid a visit to the Carr there were in addition to the above, *S. fimbriatum* var. *validius* Card. and var. *intermedium* Russ., *S. squarrosum* Pers. var. *spectabile* Russ., *S. recurvum* P. de B. var. *robustum* Breidl., and *S. inundatum* Russ. var. *lancifolium* Warnst. Some of these five would have been gathered on the occasion of the Y.N.U. visit this year if they had been present, and their absence points to the continued drying-up of the Carr.

Mosses (Joan Appleyard) : Although the mosses seen on this excursion were not very striking either in their variety or luxuriance, some interesting things were seen. Terrington Carr is obviously much drier than formerly, *Aulacomnium palustre* Schwaeg. was abundant but many mosses such as *Hypnum cordifolium* Hedw., *H. straminium* Dicks. and *H. fluitans* L., which must once have luxuriated there, were poorly represented. Mr. Thompson saw a little *Dicranum Bonjeani* De Not. *Webera carnea* Schp. grew on the sides of a ditch and *W. albicans* Schp. on a stony track in Bell Bottom Wood. A wall on the edge of Cum Hagg Wood yielded *Barbula lurida* Lindb., *B. rigidula* Mitt. and *Zygodon viridissimus* R. Brown, a moss which usually grows on trees. This may account for the fact that it was very small.

The old sandstone quarry at Castle Howard which, according to the old records, was once a bryologists' paradise, is now overgrown and not one moss of interest was found there. Nevertheless some quite good things were seen during the day, the most noteworthy being the following : *Weisia tenuis* C.M., on an old wall of the Dairies (Messrs. R. Lewis and G. A. Shaw), *Pleuridium axillare* Lindb., on drying mud by the lake (Miss C. M. Rob), *Ulota phyllantha* Brid. (Det. Miss U. K. Duncan) on an elder bush, this is an interesting find so far from the coast, *Fissidens viridulus* Wahl. var. *Lylei* Wils., confirmed by Mr. F. Crossland. Other mosses were *Hypnum aduncum* Hedw., on the shores of the lake, *H. uncinatum* Hedw., *Orthotrichum affine* Schrad., *O. diaphanum* Schrad., *Physcomitrium pyriforme* Brid. and *Amblystegium varium* Lindb. on rotten wood by the obelisk pond.

Conditions at North Grimston were very dry for the most part. Mr. A. Thompson found *Eurhynchium praelongum* Hobk. var. *Stokesii* Brid. growing on the ground near a small stream in a wood. This is a new record for V.C. 61. Mr. J. B. Duncan confirmed the naming. *Webera carnea* Schp. was fruiting sparingly by the side of the Setterington stream, a form of *Dicranum Bonjeani* De Not. approaching the var. *calcarea* Braith. occurred on the grassy hillside. *Barbula lurida* Lindb., *B. rigidula* Mitt. and *Hypnum stellatum* Schreb. were found in an old quarry and Mr. Thompson got *Amblystegium Juratzkanum* Schp. on damp ground in a wood. *Hypnum aduncum* Hedw. grew on the edge of a pool, and *Barbula cylindrica* Schp. and *Tortula ruralis* Ehrh. on the railway bridge. *Orthotrichum affine* Schrad., *O. diaphanum* Schrad. and *Camptothecium lutescens* B. & S. were frequent. Mr. Cheetham saw *Orthodontium gracile* Schwaeg. var. *heterocarpum* at Terrington Carr where *Aulacomnium androgynum* Schwaeg. was also seen.

Hepaticae (R. Lewis) : Malton and district proved most disappointing from the bryologist's point of view, particularly in regard to the paucity and poor quality of liverworts seen. This may have appeared more so to the writer who had spent a week of prolific collecting in South Devon at Easter. The following is a complete list of the species noted, the localities in which they occurred, and comments on the more critical gatherings. Where a plant was not seen by me I have added the name of the collector :

Conocephalum conicum (L.) Dum. On bridge over stream flowing into the Great Lake at Castle Howard, Miss J. Robertson.
Pellia epiphylla (L.) Corda. Near the Great Lake, Castle Howard.
Alicularia scalaris (Schrad.) Corda. In quarry at Castle Howard.
Aplozia riparia (Tayl.) Dum. Castle Howard, Mrs. J. Appleyard.
Lophozia ventricosa (Dicks.) Dum. Terrington Carr and in quarry at Castle Howard, Mrs. J. Appleyard.
?*Lophocolea heterophylla* (Schrad.) Dum. Terrington Carr. I identified this as *L. bidentata* (L.) Dum., but Dr. Jones disagreed and commented as follows : ' I should have called your *Lophocolea L. heterophylla* from the yellowish colour and the presence of at any rate some leaves with rounded lobes and shallow sinus on the apices of some stems. The cells on your plant are 22-30μ wide in the upper part of the leaf ; this cell size would do for *L. bidentata*, and *L. heterophylla* are usually a little smaller. Perhaps it is wisest not to be positive about relatively small amounts of sterile material.'
L. bidentata (L.) Dum. Terrington Carr, Mrs. Appleyard.
Cephalozia bicuspidata (L.) Dum. In quarry at Castle Howard and Terrington Carr. Dr. Jones comments as follows on several gatherings submitted to him : ' The *Cephalozias* are all, I should say, *C. bicuspidata*—an infuriatingly common plant. That from wood at Terrington Carr has cells small enough for *C. media*, a species which is far more typical of rotting wood than is *C. bicuspidata*. However, although I cannot be certain of its being monoecious, other points including the general appearance, are in favour of its being *C. bicuspidata* ; the transverse section of the perianth is perhaps decisive. It would presumably come under the forma *conferta*, with concave leaves and bracts entire-margined ; but this is a very poorly defined form.'
Calypogeia arguta Nees et Mont. In quarry at Castle Howard, A. Thompson.
Lepidozia reptans (L.) Dum. Terrington Carr. Mrs. J. Appleyard also collected a small pale form on decayed wood at Terrington Carr which seems to fit the description of var. *tenera* ; but Dr. Jones is of the opinion that both this and var. *julacea* are only habitat forms.
Diplophyllum albicans (L.) Dum. In quarry at Castle Howard.

I am indebted to Mrs. J. Appleyard, Miss J. Robertson and A. Thompson for their contributions to the above list, and also to Dr. E. W. Jones for the determination of doubtful plants and for permitting the publication of his critical comments.

Fungi (W. G. Bramley) : The lake side at Castle Howard was the only part to be visited by the writer and except for *Mitrula phalloides* nothing else has been sent to him for record purposes. A fairly long list was compiled but only the more interesting are listed below. Attention was chiefly devoted to resupinates and Discomycetes. Many of the former are still awaiting determination as well as a number of other collections.

The damp conditions of the lake side produced a number of agarics, one or two being in some numbers, particularly *Pholiota praecox*. Uredines were not particularly abundant but the aecidia of *P. phragmitis* were very conspicuous on *Rumex* leaves.

The recent publication on the British Hyaloscyphaceae by Dr. Dennis has placed students of this group in a much better position to identify their gatherings than hitherto. Special attention was therefore given to this group and the writer expresses his appreciation to Dr. Dennis for identifying or confirming his collections. Thanks are also due to Mr. W. D. Graddon for looking over a small collection of Mollisiaceae.

† Not in Mason & Grainger's *Catalogue of Yorkshire Fungi*.
* Not in Mason & Grainger's *Catalogue of Yorkshire Fungi* for V.C. 62.
Yk. Specimens deposited in Herb. Yorkshire Museum, York.
G. In Herb. W. D. Graddon, Congleton, Cheshire.
K. In Herb. R. B. G., Kew.

Discomycetes

Mitrula phalloides (Bull.) Chev., Terrington.
**Belanopsis* (*Niptera*) *pullum* (Phill. & Keith) Nannf., on *Carex*. G.

DISCOMYCETES—*continued*

Dasyscypha acutipila (Karst.) Sacc., on *Phragmites*.
**D. brevipila* le Gal., on *Populus*. K. (=*calyculaeformis* (Schum.) Rehm)
†*D. controversa* (Corda) Rehm, on *Phragmites*. K.
†*D. palearum* (Desm.) Mass., on grass. Yk.
D. soppittii Mass., on *Quercus* leaf. K. ("This seems to be a good species after all": Dennis *in litt.*)
Mollisia dilutella Karst., on *Epilobium hirsutum*. Yk.
†*Tapesia evilescens* Karst., on *Phragmites*. G. Yk.
†*T. retincola* (Rab.) Karst., on *Phragmites*. Yk.

PYRENOMYCETES

**Calyculosphaeria* (*Nitschkia*) *tristis* (Fuckel) Fitzp.
†*Diaporthe impulsa* (Cooke & Petr.) Wehm., on *Sorbus*. Yk.
D. sarothamni Auersw. var. *dulcamarae* (Nits.) Wehm., on *Solanum*. Yk.
†*Gnomoniella devexa* (Desm.) Sacc., on *Polygonum amphibium*.
†*Leptosphaeria culmorum* Auersw., on *Deschampsia caespitosa*.
†*L. nigrans* (Desm.) Ces. & de Not., on *Glyceria*.

UREDINALES

**Kuehneola albida* (Kühn) Magn., I. II. on *Rubus*.
Melampsora rostrupii Wagner, OI. on *Mercurialis*; II. on *P. alba*.
†*Puccinia mirabilissima* Peck, II. III. on *Mahonia aquifolia*.
†*Entyloma ranunculi* (Bon.) Schroet., on *Ranunculus ficaria*.
**Ustilago* (*Tilletia*) *striaeformis* (Westend.) on *Holcus*.
Urocystis violae (Sow.) Fisch. v. Wald., on *Viola sp.*

APHYLLOPHORALES

Fomes conchatus (Pers.) Fr., on *Populus*. Yk.
F. ignarius (Linn.) Fr., on *Salix*.
Peniophora pubera (Fr.) Sacc., on *Populus*.
P. hydnoides Cooke & Mass.
**Corticium* (*Gleo*) *albostramineum* (Bres.) Bourd. & Galz., on *Populus*.

AURICULARIALES

Auricularia auricula-judae (Linn.) Schroet., on *Populus*, *Salix* and *Sambucus*.

FUNGI IMPERFECTI

Phoma macrocapsa Trail, on *Mercurialis*.
†*Papularia arundinis* (Corda) Fr., on *Phragmites*. Yk.

RIPON, June 10th

Ornithology (Ralph Chislett): Mixed woodlands, with and without undergrowth, meadows and pastures, wet and dry, adjacent to the Ure banks, from below Hutton Conyers to the neighbourhood of Plastorfit, provided a good variety of birds. Warblers were in fair numbers, with Chiffchaff and Wood-Warbler scarce and the Lesser Whitethroat unrecorded. A Grasshopper Warbler was reported as heard once. Kingfishers occurred twice. A few Lapwings and a pair of Redshanks had young; as also had a pair of Oystercatchers. If Yorkshiremen judged a species by its habits in Yorkshire, the Oystercatcher would be summarised as a breeder along river banks and only more occasionally along the sea coast; the neighbourhood of all the rivers flowing from the Yorkshire Pennines have a few breeding Oystercatchers where spates have produced shingle-beds.

Altogether 64 species were identified, comprising additionally to the species mentioned above: five members of the Crow family (Magpie and Jay were scarce), Starling, five Finches, two Buntings, Skylark, Tree-Pipit, Pied Wagtail, five Tits, Goldcrest, Spotted and (one) Pied Flycatcher, Sedge Warbler, Garden Warbler, Blackcap, Whitethroat, three of the Turdidae, Whinchat, Redstart, Robin, Hedge-Sparrow, Wren, all three of the hirundines and Swift, Great-spotted Woodpecker, Cuckoo, Tawny Owl, a Heron, Mallard, the three inland Doves, Sandpiper, Curlew, Black-headed and (one) Lesser Black-backed Gull, Moorhen, Pheasant and Partridge.

Lepidoptera (J. P. Utley) : Ten species of Butterfly were seen of which the Orange Tip and Wall were common. The others were Large White, Small White, Red Admiral, Painted Lady, Small Tortoiseshell, Small Copper, Common Blue and Large Skipper.

Diptera (K. G. Payne) : Amongst the species taken those so far identified include the following : *Pales quadrifaria* Mg., common, *P. flavescens* L., *Tipula lunata* L., *T. vernalis* Mg., *T. montium* Egger., *Limnobia tripunctata* F., *L. macrostigma* Schummel, *Epiphragma ocellais* L., *Dioctria rufipes* Deg., swept commonly from vegetation near the river.

Freshwater Biology (H. Whitehead) : Mr. K. G. Payne and I spent a profitable day on a short stretch of the left bank of the river in V.C. 64. The water level was low and the exposed river bed consisted almost entirely of well-rounded pebbles. There was very little growth of filamentous algae but the submerged pebbles were covered with a brown deposit which served as pabulum for a variety of organisms. The most striking feature was evidence of numbers of the large stonefly, *Perla carlukiana* Klap. In addition to many nymphs and a few winged males and females there were large numbers of *exuviae* denoting that there had been a good ' rise ' of this fly earlier in the year. This species is of particular interest inasmuch as it is not found outside Britain and the wings of the male are much smaller than those of the female.

There was good evidence of a rich fauna of Mayflies of which the most interesting was *Ecdyonurus insignis* (Etn.) with imagoes and nymphs. This somewhat local species has been taken higher up the river at Tanfield. *Heptagenia sulphurea* (Müll.), the Yellow Hawk of the fishermen, was taken on the wing and also one of the Pale Watery Duns, *Centroptilum luteolum* (Müll.).

No winged caddises were seen but larvae of *Hydropsyche* and *Polycentropus* were found under submerged stones.

Another point of interest noted was the effect of differences of rate of flow on the distribution of animal life. The river bed was remarkably uniform in character but small channels had been formed where the current was stronger. In one of these channels the undersides of the stones were completely covered with pupae of *Simulium*, a dipterous insect found only in rapid streams. No traces of *Simulium* were found in any other part of the river bed.

Flowering Plants (Miss Rob) : The day was both successful and enjoyable. No new records resulted from the botanists' efforts, but a number of interesting plants were noted. The best find of the day was a small quantity of *Arenaria tenuiflora*, but the wonderful growth of *Hesperis matronalis* L. all along the river bank was the most spectacular. *Senecio squalidus* L. was on the shingle bank, also *Echium vulgare* L., *Cynoglossum officinale* L., *Mimulus guttatus* DC., and *Saponaria officinalis* L.

Sedges were plentiful. *Carex paniculata* L., *C. acutiformis* Ehrh., *C. acuta* L. and *C. remota* L. were noted and *Scirpus sylvaticus* L. and *S. lacustris* L. were plentiful.

Other plants seen were *Orchis ustulata* L., *Bryonia dioica* Jacq., *Allium Scorodoprasum* L., *Arenaria leptoclados* (Rchb.) Guss., *Ranunculus sceleratus* L., *Filipendula hexapetala* Gilib. and *Campanula glomerata* L.

Mosses (A. Thompson) : The ground chosen for this excursion, the neighbourhood of the bank of the River Ure above Nunwick, was exceptionally poor in mosses. Even such common species as *Ceratodon purpureus* Brid. and *Amblystegium serpens* B. & S. were only present in small quantities. The ground in a wood provided *Fissidens taxifolius* Hedw. and *Eurhynchium swartzii* Hobk. *Bryum pallens* Sw. occurred sparingly on sandy ground, but owing to the habitat was small. There was *Fontinalis antipyretica* L. in the river but because of the unstable pebbly bed, not much of it. The species that live on the roots of trees near rivers had little chance of existence as the trees were absent but careful search amongst logs that had been washed down by floods produced *Tortula mutica* Lindb., *Orthotrichum diaphanum* Schrad. and *Leskea polycarpa* Ehrh.

Mrs. Appleyard discovered *Bryum atropurpureum* W. & M. var. *gracilentum* Tayl. near the river bank but she had already had it from another part of V.C. 64 as a new record.

Fungi (W. G. Bramley) : Owing to a large amount of unexamined material already accumulated it was the writer's intention to collect very little and this was largely carried out. Two Pyrenomycetes were collected, however, which he had not seen before and a further visit was paid to collect more material. A few Discomycetes were also collected on the old vegetation round one of the ponds. Much more could have been taken had further investigation been conducted. A still later visit was paid to get more material of a *Melampsora* on *Salix purpurea* collected by Miss Rob, but a brief search, stopped by rain, proved unsuccessful.

Aecidia of *Uromyces geranii* were extremely abundant on a partially dried-up pond near the river, together with *Plasmopara pusilla*. Rather surprisingly, no sign of *Triphragmium ulmariae* was seen, though its host was common. Several members remarked on the odour exhaled by the spermagonia of *Puccinia obtegens* which was well infected.

Help received in determination of material is acknowledged from Dr. Dennis, Mr. J. Webster and Mr. W. D. Graddon.

The following is a list of the more interesting species observed.

Yk. indicates that specimens are deposited in the Yorkshire Museum, York.

† Not in Mason & Grainger's *Catalogue of Yorkshire Fungi*.

* Not in Mason & Grainger for V.C. 65.

PHYCOMYCETES

**Bremia lactucae* Regel, on *Sonchus*.
†*Peronospora ficariae* Tul., on *Ranunculus repens*.

DISCOMYCETES

Dasyscypha acutipila (Karst.) Sacc., on *Phragmites*.
†*D. controversa* (Cooke) Rehm, on *Phragmites*.
†*D. leucophaea* (Pers.), on *Epilobium hirsutum*. Yk.
†*D. nudipes* var. *minor* Dennis, on *Epilobium hirsutum*. Yk.
D. nidulus (Schm. & Kunze) Mass., on *Epilobium hirsutum*. Yk.
†*D. pudicella* (Quel.) Sacc., on grasses. Besides the type a yellow form, the colour of which in some cases disappears on drying, was found. Dr. Dennis finds no difference except in colour and slightly shorter stalk. Yk.
†*Helotium robustus* (Karst.) Karst., on *Epilobium*. Yk.
†*Tapesia retincola* (Rab.) Karst., on *Phragmites*.

PYRENOMYCETES

†*Leptosphaeria arundinacea* (Sow.) Sacc., on *Phragmites*.
†*L. derasa* (B. & Br.) Auersw., on *Senecio*.
†*L. nigrans* (Desm.) Ces. & de Not., on grasses.

The two following were collected 16/6/50 at Queen Mary's Dub on the opposite bank of the river. Specimens in Herb. University of Sheffield.

†*Ophiobolus fruticum* (Rob. & Desm.) Sacc., on *Ononis*.
†*Pleospora typhicola* (Cooke) Sacc., on *Typha*.

UREDINALES

**Puccinia arrhenatheri* Erikss., II. on *A. elatior*.
**P. bromina* Erikss., on *B. sterilis*.
**P. triseti* Erikss., on *T. flavescens*.
**Urocystis agropyri* (Preuss) Schroet., on grass.

FUNGI IMPERFECTI

**Periconia pycnospora* Fres., on *Urtica*.
Torula herbarum Pers. ex Fr., on *Epilobium*, *Phragmites*, *Urtica* and grass stems.

WINTERBURN AND HETTON, June 24th

This meeting unfortunately was held on a wet day and very little entomological work could be done. Under better conditions the region downstream from the reservoir bank should prove rich in insects ; the valley is narrow, well wooded and is sheltered from the north by the high embankment and the stream is regulated and free from floods or drought. The mosses and liverworts in the stream are those associated with gritstone.

Ornithology (J. P. Utley) : Unfortunately the drizzle and showers of rain which persisted with varying intensity for most of the day made the grass and undergrowth, which was now long and luscious, very wet, with decidedly 'damping' effects on certain exploratory durations. Except during periods of heavy rain, visibility was good for ordinary observations.

In general, Winterburn Reservoir was disappointing ; not a single bird was seen on the water but Sandpipers were frequently flitting across from shore to shore and Oystercatchers, probably from near Gargrave, made occasional visits. The water was much contracted in area by reason of its being about twenty feet below overflow level.

Around and above the reservoir were many Curlews ; Golden Plover and Redshank were noted while at the head of the water was a pair of Reed Buntings, also a pair of Yellow Wagtails in a pasture field.

The dell below the reservoir, as far as Winterburn Hall, was more productive, being rich in bird life. Blackcap, Garden Warbler and Whitethroat were singing. Spotted Flycatchers were fairly common and near the Hall a pair of Goldfinches obligingly allowed an excellent view to be taken. By the side of the stream were young Sandpipers and a pair of Grey Wagtails were feeding young in a nest. The snatching of a recently fledged Great Tit from a bare, exposed twig on a spruce by a Sparrow Hawk was an unfortunate incident which was witnessed. A keen look-out was kept for Pied Flycatcher and eventually a female was seen feeding young in a nest in a tree up the wooded ravine behind the Hall. Although no Nuthatches were recorded the keeper said that the bird was seen in the woods at odd times. Corvidae were not common in the area visited.

A total of 62 species were listed as follows : Carrion Crow, Rook, Jackdaw, Magpie, Starling, Greenfinch, Goldfinch, Linnet, Chaffinch, House Sparrow, Yellow Bunting, Reed Bunting, Skylark, Meadow Pipit, Tree Pipit, Yellow Wagtail, Grey Wagtail, Pied Wagtail, Tree Creeper, Great Tit, Blue Tit, Coal Tit, Goldcrest, Spotted Flycatcher, Pied Flycatcher, Willow Warbler, Wood Warbler, Garden Warbler, Blackcap, Whitethroat, Song Thrush, Blackbird, Wheatear, Redstart, Robin, Hedge Sparrow, Wren, Dipper, Swallow, Martin, Sand Martin, Swift, Kingfisher, Green Woodpecker, Great Spotted Woodpecker, Cuckoo, Little Owl, Sparrow Hawk, Mallard, Wood Pigeon, Oystercatcher, Golden Plover, Lapwing, Common Sandpiper, Redshank, Curlew, Common Snipe, Black-headed Gull, Herring Gull, Lesser Black-backed Gull, Pheasant and Partirdge.

Freshwater Biology (H. Whitehead) : The stream bed consists of sub-angular stones of various sizes, many of which were covered with moss. There were very few filamentous algae. Near the banks were patches of submerged sand. These conditions, together with a steady flow of water regulated at the Reservoir, produced conditions favourable to a varied fauna. Unfortunately the weather was unfavourable for continuous work but between showers Mr. Cheetham and I took the following species on the wing : Trichoptera—*Odontocerum albicorne* Scop. ♀, *Philopotamus montanus* Don. ♀ ; Ephemeroptera—*Ephemera danica* Müll. ♂♂ and ♀♀ and sub-imagoes. Nymphs of this species were found in the sandy patches : *Habrophlebia fusca* (Curt.) ♂, *Baetis pumilus* (Burm.), both sexes fairly common, *Ecdyonurus torrentis* Kimm. ♂, and nymphs under stones ; Plecoptera—*Chloroperla torrentium* (Pict.) ♀ and *Leuctra hippopus* (Kpny.) ♀. In the stream were larvae of *Hydropsyche*, *Rhyacophila* and *Stenophylax*. Nymphs of *Ephemerella ignita* (Poda) were common and so was the freshwater Shrimp, *Gammarus pulex* L. A few sweeps of the net were made in the Reservoir for plankton. This was not very rich. It contained *Conochilus volvox* and a number of copepods belonging to the group Calanoida. A few ephippia or resting eggs of Cladocera were taken.

Flowering Plants (Miss C. M. Rob) : The district was disappointing for botanists, the reservoir particularly so. No aquatic plants were seen and the shore was almost as unproductive. *Equisetum limosum* L. occurred in several parts, also plenty of *E. palustre* L. Where this plant was growing on the drying mud its growth was abnormal. *Potentilla anserina* L. covered large areas of the shore, *Rumex crispus* L. and *Plantago major* L. being the other dominant species.

The gills leading to the reservoir were slightly better. Here were noted : *Geranium sylvaticum* L., *Crepis paludosa* (L.) Moench., *Orchis Fuchsii* Druce, *Carex disticha* Huds., *C. lepidocarpa* Tausch., and *Equisetum Telmateia* Ehrh.

Primula farinosa L., *Pinguicula vulgaris* L. and *Carex tumidicarpa* Anderss. were seen on the high ground between the reservoir and Hetton village. Other plants seen on the excursion included *Alchemilla vestita* (Buser) Raunk., *A. xanthochlora* Rothm., *A. glabra* Neyg., *Campanula latifolia* L., *Carex pulicaris* L., *C. acutiformis* Ehrh., and *C. ovalis* Good.

Mosses (Mrs. J. Appleyard) : The list of mosses gathered on this excursion was not impressive, although Mr. Thompson got *Grimmia apocarpa* Hedw. var. *alpicola* H. & T. with fruit from the stonework of the reservoir. This has only been found once before in Yorkshire, at Thornton, Kingsdale, V.C. 64. Another interesting moss was *Tortula aloides* De Not. which occurred in some quantity at one spot on the clayey side of one of the gills running into the reservoir. On the stones of the stream *Orthotrichum cupulatum* Hoffm. grew abundantly and in fine fruit. Mr. Thompson also found it with *Barbula cylindrica* Schp. on an iron grate over a road drain below the reservoir. Other mosses noted, besides some of the commonest species, were : *Pleuridium subulatum* Rabenh., *Barbula tophacea* Mitt., *B. fallax* Hedw., *B. rigidula* Mitt., *Trichostomum tortuosum* Dixon, *Physcomitrium pyriforme* Brid., *Neckera complanata* Huebn., *Eurhynchium murale* Milde, *Plagiothecium denticulatum* B. & S., *Hypnum stellatum* Schreb. and *H. ochraceum* Turn.

Mr. Shaw had *Pylaisia polyantha* B. & S. with fruit from a tree in a lane behind Hetton.

DRIFFIELD, July 8th

It was exactly eleven years to the day since last the Union visited Kelleythorpe Marsh near Driffield. The contrast in the weather experienced on these two visits could scarcely have been greater. Instead of the torrential rain which put an end to the 1939 excursion we had blue skies and warm sunshine throughout the day. The provisional arrangements for visiting King's Mill and the marshy ground in its vicinity were waived, the party proceeding direct to Kelleythorpe. This area is much the more interesting of the two and the marsh and neighbouring fields provided ground for investigation amply sufficient to keep the party occupied throughout the time available.

Ornithology (R. Chislett) : A small party spent an enjoyable day in the woods about the Kelleythorpe pools and along the river banks. Sedge-Warblers were almost the only warblers singing, but Lesser Redpolls, Goldfinches and Reed, Yellow and Corn Buntings were heard and seen repeatedly. Willow-Tits were suspected but their presence not proved. A Kingfisher, a female Tufted Duck and Turtle Doves were noteworthy. Birds identified totalled 41 species and included (additionally to the above-mentioned) : Crow, Rook, Jackdaw and Magpie, Starling, Greenfinch, Bullfinch, Skylark, Tree-Pipit, Pied Wagtail and young, Great, Coal and Marsh Tits, Spotted Flycatcher, Willow Warbler, Whitethroat, Blackcap or Garden Warbler (perhaps both), Mistle-Thrush, Song-Thrush and Blackbird, Hedge-Sparrow, Wren, Swallow, Martin, Swift, Mallard, Wood-Pigeon, Lapwing, Snipe, one or two Black-headed Gulls and a number of Common Gulls (mostly immature) and numerous Moorhens.

Flowering Plants (W. A. Sledge) : In spite of increased ploughing in the vicinity of the marsh, the marsh itself does not seem to have changed since pre-war days. It was gratifying to find that all of the rare species which were known to grow here are still present and to make one or two additions to the recorded flora. All the plants seen here in 1939 were re-observed and nearly all the species listed in the circular were noted. The following list includes the more noteworthy species :

Ranunculus Lingua L.
Comarum palustre L.
Hippuris vulgaris L.
Sium erectum Huds.
Galium uliginosum L.
Cirsium dissectum (L.) Hill
Campanula glomerata L. (railway embankment)
Veronica Anagallis-aquatica L.
Menyanthes trifoliata L.
Epipactis palustris (L.) Crantz
Orchis latifolia L. sec Pugsl.
Juncus subnodulosus Schrank
Potamogeton coloratus Hornem.
Blysmus compressus (L.) Link
Scirpus Tabernaemontani C. C. Gmel.

Schoenus nigricans L.
Carex diandra Schrank
C. paniculata L.
C. spicata Huds.
C. elata All.
Carex Hostiana DC.
C. lepidocarpa Tausch.
C. lasiocarpa Ehrh.
C. riparia Stokes
Thelypteris palustris Schott.

The puzzling sedges referred to in my note on this locality in *The Naturalist*, 1939, 296 were again examined and I am now of opinion that these are reduced forms of *C. paniculata* rather than hybrids. The occurrence of hybrids with *C. diandra* remains a possibility, however, as both species grow together and in large quantity. It should be noted also that *Schoenus nigricans* which was seen here in 1939 but which is referred to in the Circular as ' not found in recent years ' is still present. *Scirpus Tabernaemontani* is a new record for this area. On a later visit Mr. R. Lewis found a small patch of *Parnassia palustris*.

A chalky fallow field bordering the marsh yielded some interesting cornfield weeds. It was instructive to see *Veronica agrestis* L., *V. persica* Poir., *V. polita* Fr. and *V. hederaefolia* L. all growing together. Other species in the same field included :

Fumaria parviflora Lam.
Melandrium noctiflorum (L.) Fr.
Scandix Pecten-veneris L.
Valerianella dentata (L.) Poll.
Specularia hybrida (L.) A. DC.
Lamium amplexicaule L.

Bromus lepidus Holmb. was noted by the roadside between Driffield and Kelleythorpe.

Bryology (R. Lewis) : The East Riding generally is not a good vice-county for bryophytes, and it was not anticipated that any additions for V.C. 61 would be made on this occasion. The most interesting mosses found were *Hypnum stellatum*, *H. lycopodioides*, *H. revolvens* and *H. intermedium*, the first two being new records for the Driffield district. The hepatics are very poorly represented in the district, and nothing of interest was recorded on the actual day of the excursion. However, on a subsequent visit I found *Marchantia polymorpha* forma *aquatica* growing on mud in deep shade near the centre of the marsh at Kelleythorpe. This is a most unusual plant which answers very well to the description in MacVicar's *The Students' Handbook of British Hepatics*, but it would appear to be worthy of varietal or even specific rank rather than a form. This appears to be the first record of the form from V.C. 61.

I am endeavouring to make a detailed survey of the flora of Kelleythorpe Marsh and the immediate vicinity, and the list of bryophytes which follows, although only a short one, gives a complete record of all the species noted during the excursion and on previous and subsequent visits made by me. Where I have not, personally, seen any plant mentioned below, I have given the recorder's name.

Sphagna : The peat mosses are totally absent from this marsh.

TRUE MOSSES

Ceratodon purpureus Brid., c.fr.
Dicranum scoparium Hedw.
Fissidens adiantoides Hedw., c. fr.
Barbula unguiculata Hedw. per Mrs. J. Appleyard.
Orthotrichum affine Schrad., c. fr.
Physcomitrium pyriforme Brid., c. fr. per Mrs. J. Appleyard.
Funaria hygrometrica Sibth., c. fr.
Aulacomnium androgynum Schwaeg.
Webera carnea Schp.
Bryum capillare L. per Mrs. J. Appleyard.
Mnium rostratum Schrad.
M. undulatum L.
M. hornum L.
M. punctatum L.
Fontinalis antipyretica L.
Climacium dendroides Web. & Mohr.
Brachythecium rutabulum B. & S.
B. rivulare B. & S.
Eurhynchium praelongum Hbk. per Mrs. J. Appleyard.
E. Swartzii Hbk.
Plagiothecium denticulatum B. & S.
Amblystegium serpens B. & S.
A. Juratzkanum Schp., c. fr.
A. filicinum De Not.
Hypnum riparium L.
H. stellatum Schreb.
H. lycopodioides Schwaeg.
H. revolvens Swartz
H. intermedium Lindb.
H. cupressiforme L. and var. *resupinatum* Schp.
H. giganteum Schp.
H. cuspidatum L.
Hylocomium squarrosum B.& S.

HEPATICS

Conocephalum conicum (L.) Dum.
Lunularia cruciata (L.) Dum.
Marchantia polymorpha L., c. fr. Fine fruiting material on mud, first noted by Miss L. I. Scott.
Marchantia polymorpha L. forma *aquatica* Nees.
Pellia epiphylla (L.) Corda
Lophocolea cuspidata (L.) Limpr.
L. heterophylla (Schrad.) Dum.

I am indebted to Mrs. J. Appleyard, Miss J. Robertson and Miss L. I. Scott for assistance in the field, and to Messrs. J. B. Duncan, A. Thompson and E. C. Wallace for their determinations of doubtful plants. For the confirmation of my identification of the forma *aquatica* of *Marchantia polymorpha*, I am indebted to Mr. A. E. Wade, of the National Museum of Wales.

BRADFIELD AND AGDEN, July 22nd

This excursion was held during a period of unsettled weather and we were fortunate to complete the route without experiencing more than two showers of brief duration. Shortly after arriving at Strines Inn for tea the rain set in in earnest and the journey back to Sheffield was completed in a heavy downpour. But admirable arrangements had been made by Mr. Brown ; a private bus conveyed the party to Bradfield and was waiting to take us to Strines, and later to Sheffield, after the walk down from the moor above Agden Reservoir. No meeting was held after tea owing to shortage of time for those who had to catch trains north from Sheffield, but the thanks of the party were expressed to Mr. John Brown for the excellent arrangements he had made for the excursion.

Though well known to Sheffield botanists this area has not previously been visited by the Union. The route led from Bradfield past the northern side of Agden Reservoir and thence up Agden Dyke to the moorlands returning round the southern side of the Reservoir. The area covered was clough and moorland country typical of the Southern Pennine gritstones. Floristically such ground is usually poor in species but the route arranged enabled those present to see an unusually large number of interesting plants for the type of ground traversed.

Ornithology. An area of gritstone moorland, with reservoirs and woodland, was unlikely to produce either the unexpected or a large variety of species in July. The list supplied by Mr. C. V. Horrocks of the Barnsley Society includes : Rook, Jackdaw, Magpie, Jay, Linnet (nest with four eggs), Blue-Tit, Pied Wagtail, Meadow-Pipit, Tree-Creeper, Willow-Warbler, Whinchat, Redstart, Robin, Kestrel, Woodcock, Curlew, Lapwing, Common Sandpiper and Red Grouse.

Flowering Plants (W. A. Sledge) : The first plant of interest seen was at Low Bradfield where *Umbilicus pendulinus* DC., first recorded from here nearly 150 years ago by J. Salt, is still plentiful on a wall by the roadside. On the banks of the stream below, *Rorippa sylvestris* (L.) Besser was also plentiful and a single plant of a hybrid *Epilobium* of doubtful parentage was pointed out nearby. Soon after leaving the bus and beginning the walk to Agden Dyke a small but very interesting bog adjacent to the path and a little to the north-west of the neck of the Reservoir was examined. The plants growing here included :

Hypericum elodes L.
Lotus uliginosus Schkuhr.
Drosera rotundifolia L.
Oxycoccus quadripetalus Gilib.
Anagallis tenella (L.) Murr.
Pinguicula vulgaris L.
Scutellaria minor Huds.
Potamogeton polygonifolius Pourr.
Carex Hostiana DC.
C. tumidicarpa Anderss.

A perplexing *Carex* allied to *C. tumidicarpa* but with a different and distinctive habit also grew in this bog and on dryer ground nearby amongst *Empetrum*, *Vaccinium myrtillus* L. and *V. Vitis-idaea* L. there was a good colony of $\times$ *V. intermedium* Ruthe. This hybrid was seen again later in the day on the moorland above Agden Dyke. It is now known to Sheffield botanists in at least a dozen different localities and doubtless occurs in many other places on these moors where the two parent species occupy very extensive areas.

Agden Dyke is a good example of typical clough scenery and upland birch-oak woodland vegetation. In addition to the common species characteristic of the peaty, base-deficient soils the plants seen here included *Cardamine amara* L.

Crepis paludosa (L.) Moench, *Carex laevigata* Sm. and *Lycopodium clavatum* L. After returning to Agden Reservoir a halt was made west of Low Bradfield *en route* for Strines, and here *Potentilla procumbens* Sibth. and *Jasione montana* L. were seen.

Bryology (Mrs. J. Appleyard) : The following mosses were noted in the bog near the head of Agden Reservoir :

Hypnum stellatum Schreb.
H. revolvens Swartz
H. exannulatum Guemb.
H. falcatum Brid.
Philonotis fontana Brid.
Aulacomnium palustre Schwaeg.
Mnium subglobosum B. & S.
Dicranella cerviculata Schp.
Bryum pseudotriquetrum Schwaeg., with fruit
Funaria ericetorum Dix., on the turfy bank at the edge of the bog.

Many more species worth mentioning might have been recorded from Agden Dyke had there been more time and more bryologists. It was impossible to work both the stream and its banks. Mr. Brown pointed out *Catharinea crispa* James by the stream, but attention was almost entirely devoted to the ground on or near the path. Mr. Brown showed us *Schistostega osmundacea* Mohr. on a steep sandy bank. Nearby was a patch of *Ditrichum homomallum* Hampe on which were capsules in varying stages of development, some quite mature. In one boggy patch there was some *Hypnum commutatum* Hedw., indicating the presence of lime, unexpected in this area. Other mosses were : *Polytrichum aloides* Hedw., *P. piliferum* Schreb., *Webera albicans* Schp., *Dichodontium pellucidum* Schp., *Hyocomium flagellare* B. & S., *Dicranella rufescens* Schp. showing the characteristic male inflorescence and *Rhacomitrium fasciculare* Brid. on Agden Bridge.

Hepatics

The two common moorland hepatics, *Alicularia scalaris* (Schrad.) Corda and *Gymnocolea inflata* (Huds.) Dum. were frequent. *Calypogeia fissa* (L.) Raddi and *Aplozia crenulata* (Sm.) Dum. were associated with the *Schistostega*. Other hepatics were *Lepidozia reptans* (L.) Dum., *Lophozia Floerkii* (Web. et Mohr) Schiffn., *L. attenuata* (Mart.) Dum., *L. ventricosa* (Dicks.) Dum., *Lophocolea bidentata* (L.) Dum., *Scapania dentata* Dum. and *Aneura pinguis* (L.) Dum.

BOOK REVIEWS

A Naturalist in the Gran Chaco, by **Sir John Graham Kerr.** Pp. xii+236 with 14 plates and 2 maps. Cambridge University Press, 21/-.

Sixty years ago John Graham Kerr, at that time a medical student not yet twenty-one years old, enlisted as a naturalist on an expedition organised by Captain Page of the Argentine Navy. The expedition set out to navigate the Pilcomayo River (which forms the boundary between Argentina and Paraguay) through the swamps and forests of the Gran Chaco as far as Bolivia. The expedition failed in its objective. An abnormally dry season reduced the water in the river to so low a level that progress could eventually only be made by building dams at intervals and waiting until sufficient water had collected to enable a little further advance to be made. Finally it became impossible to push on any further and the boat lay stranded for nearly six months in unexplored country populated by Indians with a reputation for treachery. During this critical period, disaffection among the ship's company, starvation rations and much ill health which led to the deaths of Captain Page and the doctor threatened complete catastrophe to the whole party.

The bare chronicle of this expedition, the survival of which was due in no small measure to the author's enterprise and courage would make exciting reading. But the thrills of adventure are secondary to the wealth of natural history observations which the book contains. Mammals, birds, reptiles, fishes, insects and plants, all were patiently and painstakingly observed, assiduously collected and examined and their habits or characteristics carefully described in the diary of each day's events. Much of the book consists of extracts from the author's diary and to this is due the freshness and vividness of his account of events which took place so long ago. The toughest and most ardent naturalist might well be daunted by the conditions which have to be endured in the green hell of the Chaco ; especially the myriads of insects which sometimes forced a refuge to be sought by lying

down in the river with only the nose exposed. But great as were the discomforts and hardships they had their reward in the unfailing fascination of the rich fauna and flora.

One of the most interesting parts of the book is the account of the Natakoi Indians, an aboriginal tribe having no contacts through missionaries with civilisation and of an extremely primitive culture. The common interest which Kerr shared with the Indians, as a hunter and observer of wild animals, together with the fact that he was not among them in order ' to dispose of my own wares—material or spiritual ' led to a unique degree of intimacy and friendship between them. It was their trust in him and the escort which they provided for him across the Chaco and through the territory of a hostile neighbouring tribe to the Paraguay River, which helped to save the whole party from perishing.

Five years after the termination of this expedition Graham Kerr, now inevitably committed to a career as a zoologist, returned to the Chaco. This time it was to collect material and observe the breeding habits and aestivation of the lung fish, *Lepidosiren*. It was at that time a little known creature though it proved to be very abundant in the Central Paraguayan Chaco and indeed to form one of the chief articles of food of the Indian tribe there. The account of the second expedition which centres largely round the *Lepidosiren* work, gives a contrasting picture of the great swamps as they appeared during the wet season.

From the first to the last page, this book is of absorbing interest. The style is simple and direct, free from any conscious attempt to impress the reader or to ' touch up ' experiences and descriptions. References to personal hardships and dangers are few and brief though both their magnitude and frequency were clearly great. Our admiration is roused by the author's inflexible determination to get on with his natural history work despite insects, fever, Indians or any other hindrance ; and our respect for him as a naturalist is increased by his attitude to the animals around him which it was his task to collect as well as observe. ' They were beautiful little creatures,' he writes of a certain rare monkey, ' and it was hateful to have to sacrifice them to the cause of science.'

This is the best book on South American natural history since Bates's *Naturalist on the River Amazons*. It will undoubtedly take its place amongst the classic works of the traveller-naturalists.

W.A.S.

The Art of Botanical Illustration, by **Wilfrid Blunt.** New Naturalist Series Vol. 14. Pp. xxxii + 304, with 47 colour plates, 32 black and white plates and 75 figures in the text. Collins, 21/-.

In this book Mr. Blunt gives a history of the rise and progress of botanical illustration from the oldest known representations of plants to the work of Stella Ross-Craig. He traces the evolution of botanical art from Dioscorides and the long centuries of darkness which followed after the *De Materia Medica*, to the herbals of Brunfels and Fuchs which paved the way in the sixteenth century to a new era of botanical illustration. From then onwards with the ever-growing interest in plants and the advent of new techniques of reproduction, the body of finely illustrated literature rapidly grew until the great days at the end of the eighteenth century when scientific illustration " reached heights never surpassed before or since". The survey continues down to the present century and the work of artists still living and practising their craft.

Mr. Blunt's account is not limited to British artists or publications. He shows the influence of German, Dutch and French artists on the evolution of a standard of portrayal satisfying alike to the most fastidious artist and the most exacting botanist. Ehret, Redouté, the brothers Francis and Ferdinand Bauer, the Sowerbys, William Curtis, Walter Fitch and many scores of other names—some almost as well known others largely forgotten—all receive treatment according to their merits. There is a wealth of interesting biographical material combined with the assessment of artistic reputations. Of all his gallery of celebrities Mr. Blunt " would unhesitatingly give first place to Francis Bauer". It is of interest too to note his verdict that it is " probably safe to assert that the best botanical illustration being made to-day is to be found in England".

Since Victorian days there have been so many flower paintings " by diverse types of artists and for diverse purposes ; by bold explorers in the cause of science, and by timid spinsters to the glory of God," that it is inevitable that some are

omitted whose claims for recoginition seem at least as good as some of those who receive mention. Reginald Farrer was surely a painter as well as a horticulturist of distinction, but though his name is referred to there is no mention of his ever painting flowers. The fine water-colour paintings of orchids by Mrs. Hilda M. Godfery are omited, and so too (but perhaps with more justification because of their origin though certainly not on account of their merit) are the beautiful drawings and dissections done by A. Henry and T. Wild for Nees von Esenbeck's *Genera Plantarum Florae Germanicae*. But, to use Mr. Blunt's own verdict on another work " to cavil at such things in such a book is mere pedantry". The text is enriched by many beautiful illustrations. Released from the limitations inseparable from colour photography of scenery and landscapes, the colour plates are, collectively, the best of any volume in the series.

No such comprehensive survey of the subject has previously been attempted, nor would it have been possible without a rare combination of botanical and historical knowledge with the critical appreciation and experience of a trained artist. To these distinctions Mr. Blunt adds yet another quality. He has charm as well as scholarship ; wit as well as wisdom. His book is a distinguished addition to the literature of art and botany which will give enduring pleasure to all who love flowers and flower paintings.

W. A. S.

British Stoneworts (*Charophyta*), by **G. O. Allen.** Pp. 52 with 18 test figures. Published by the Haslemere Natural History Society and obtainable from the Secretary, H.N.H.S., Educational Museum, Haslemere, Surrey, 6/6.

The Charophytes are a small group of freshwater algae. Their large size and usually gregarious growth habit renders them conspicuous plants and has even gained them inclusion in floras otherwise restricted to vascular plants. There are 33 British species and these were fully described and beautifully illustrated in two volumes written by Groves and Canon Bullock-Webster and published by the Ray Society in 1920-24. This comprehensive account of the taxonomy and distribution of the British species is still the standard reference work for students of the group though its high price put it beyond the means of many botanists. Within a few years of its publication both the authors died and Mr. G. O. Allen, whose interest in these plants was first aroused by Groves and whose collecting was at first mainly done in India, has since been our recognised authority. Though comparatively little attention has been paid to the Charophyta by British botanists in recent years, Mr. Allen has continued to plough his lonely furrow with undiminished enthusiasm and the thoroughly competent booklet which he has now written should help to revive interest in this isolated and intriguing group of plants. It makes available for the first time an inexpensive and concise guide to the systematics of British Charophytes equally suitable both for those with and without previous knowledge.

His account follows the lines of the standard monograph on a less ambitious scale, describing the structure of the plants and the differences between the genera represented in Britain. This is followed by keys to, and descriptions of, all the British species and their varieties. The distribution of the species at home and abroad is given and much additional information bearing upon their taxonomy and occurence. It is thus a distillation of the essence of Groves and Bullock-Webster's work to which are added the fruits of his own long study and experience. As such it is an invaluable guide to the study of Charophytes which should find a place on the shelves of every British botanist who posseses or has access to a microscope.

W.A.S.

The Observer's Book of British Ferns, compiled by **W. J. Stokoe.** Pp.128, with 36 colour plates and introductory text figures. Frederick.Warn & Co., 5/-.

In this book practically all the British ferns are described and illustrated. It is a useful addition to a useful series though its utility could quite easily have been considerably increased. It would have been most helpful to the beginner if a brief key to the genera and species had been included after the introduction dealing with the morphology and life history of ferns ; or if the essential characters distinguishing different species of the same genus had been indicated in italics in the descriptions. Such an arrangement would have greatly simplified the task of

identification by focussing the attention of the beginner on the characters of primary importance for distinguishing related species. As it is he will rely largely on the illustrations and these are not always sufficiently clear or characteristic. It is to be hoped that this simple addition will be made in any future edition.

W.A.S.

The Littoral Fauna of Great Britain, by **N. B. Eales.** Second edition, Pp. xvi+305 with 111 figures grouped into 25 plates. Cambridge University Press, 20/-.

It is not surprising that a second edition of this book has been called for. The first edition bridged an awkward gap in the available literature and deservedly achieved a high degree of popularity amongst students of the British marine fauna. It was a very handy reference book in which the use of most of the identification keys was well within the capacity of the student of university level. In this respect it successfully achieved its aim of providing preliminary training in systematic work.

In the second edition there are no great changes in the body of the text, a tribute to the skill and care with which the keys and descriptions of the various groups were originally compiled. In the appendix examples of the use of ecological methods have been added, sufficient to lead one to suggest that Dr. Eales might consider publishing a small companion volume on this subject. The use of the square frame is illustrated by a study of the distribution of *Tellina tenuis* in relation to tide levels. A method, suitable for students, of taking a belt transect, is also described and a sample of the kind of result which might be obtained is given.

H.H.

An Introduction to the Natural History of British Sawflies by **R. B. Benson.** Transactions of the Society for British Entomology, Vol. 10 Part 2. Pp. 45-142. 9 distribution maps. 10/-.

This is an attempt, on a much smaller scale, to do for the sawflies of Great Britain what Mr. Ford did for the butterflies in the first of the *New Naturalist* volumes. From the beginning such an attempt, however gallant, could only reveal the relative paucity of our knowledge of British sawflies. This does not mean the effort has in any way failed. There is much information on sawfly biology, feeding habits and parasites. This is followed by a very competent discussion of the distribution of British sawflies in relation to palaearctic distribution and the biogeography of these islands. Finally there is an attractive, not over technical, account of parthenogenesis in sawffies.

There could be no better illustration of how scientific natural history depends on adequate taxonomy than the matter in this booklet. Time and again decisions on certain problems become tentative because of the uncertainty of the taxonomic reliability of records. Perhaps Mr. Benson's work will stimulate a wider interest in sawflies and lead to a much better knowledge of sawfly taxonomy and distribution, at least in this country. H. H.

Portraits of Mountains, edited by **Eileen Molony.** Pp. 118, with 12 plates. Dennis Dobson, Ltd., 8/6.

This is a collection of eleven essays by different writers, each descriptive of his or her favourite mountain. Several of them originated as Third Programme broadcast talks and each one varies with the outlook of its author. Geoffrey Grigson selects Ingleborough as his ideal mountain, finding more satisfaction in searching for flowers in the limestone pavements than in scaling buttresses, gulleys and chimneys which are the delight of the climbers. Yorkshire figures a second time in H. R. Jukes's account of Great Whernside, and James Fisher writes about Stac Polly in the dual rôle of climber and naturalist. To Stephen Bone the challenge of Corserine lies not in its ascent or natural history but in transferring it to canvas. Great Gable, Snowdon, Tryfan and Ben Nevis are seen through the eyes of the climbers Peter Bicknell, Dorothy Pilley Richards, Wilfrid Noyce and W. H. Murray ; and Helvellyn, Bidean nam Bian and the Glyders are described by Janet Adam Smith, G. R. Taylor and Esmé Firbank. Despite the different approach of each writer to his subject the common affection for mountains which they all share is well reflected in their writings, which will give pleasure and enjoyment to anyone with a similar taste for high places.

CONTRIBUTORS

Ainsworth, G. H., Circular Notes (Appendix), 158
Appleyard, Mrs. J., 126, 168, 174, 177

Beckwith, F., 68-69
Braham, A. C., 132
Bramley, W. G., 73-76, Circular Notes (Appendix), 161-164, 169-170, 171
Brown, J. M., 30-31
Brown, John, Circular Notes (Appendix)
Burtsal, K. F., 19-20
Butterfield, W. A., 157

Carr, L., Circular Notes (Appendix)
Cheetham, C. A., 10, 29, 32, Circular Notes (Appendix), 166
Chislett, R., 27, 39, 40, 64-66, 77, Circular Notes (Appendix), 158, 165, 170, 174
Condry, W. M., 11-16
Crump, W. B., 133-141

Dearing, E., 28-29, 71-72
Dibb, J. R., 30

Elliott, J. H., 80

Frankland, N., Circular Notes (Appendix)
Fryer, G., 148, 160

Garnett, R. M., 43, 158
Glegg, W. E., 127
Grainger, Miss J., 38
Gent, C. J., 61-62

Hazelwood, Mrs. A., 25-27, 80
Henson, H., 129, 180
Hilary, Miss D., 35-37
Hincks, W. D., 31-32, 131, Circular Notes (Appendix)

Holmes, E., 80
Holmes, P. F., 126
Hooper, W. M., 149-157
Hooper, J. H. D., 149-157
Horrocks, E. V., 176

Lewis, R., 126, Circular Notes (Appendix), 168-169, 175-176
Lund, J. W. G., 45-49, 143-148

Meiklejohn, M. F. M., 40, 77-78, 131
Moorhouse, Mrs. E. M., 27-28, Circular Notes (Appendix), 165

Nelson, G. A., 141-142

Payne, K. G., 171
Parmenter, L., 56-59
Pearce, E. J., 142
Pearson, A. A., 81-99, 100, 101-102

Remy, Paul A., 103-108
Reynolds, N., 49-55
Rimington, C. F., 164
Rob, Miss C. M., Circular Notes (Appendix), 167, 171, 173

Scott, Lorna I., 1-10
Shaw, G. A., 59
Shaw, T. R., 149-157
Sledge, W. A., 32-35, 39, 41, 43, 70, 129, 133-141, 159-160, 174-175, 176, 177, 178, 179
Smith, A. Malins, 71-72
Snaith, E., Circular Notes (Appendix)
Stubbs, R., 102

Taylor, E. W., 67-68
Taylor, F. J., 49-55
Temperley, George W., 109-125
Thompson, A., 60, 168, 171
Tordoff, H., 71-72

Utley, J. P., 42, Circular Notes (Appendix), 171, 173

Versey, H. C., 79, Circular Notes (Appendix)

Walsh, H., 37-38, 126, 127-128
Wallis, A. J., 63-64
Watson, W., 17-19
Wattam, W. E. L., 24-25, 60
Whitehead, H., 22-24, 30, 126, 131, Circular Notes (Appendix), 166-167, 171, 173
Wilcockson, W. H., Circular Notes (Appendix)
Worsley, Mrs. H. M., Circular Notes (Appendix)

Yeats, G. K., 130

CLASSIFIED INDEX

COMPILED BY W. E. L. WATTAM.

Algae.—Algological Notes, illustrated, J. W. G. Lund, 45-49, 143-148 ; Notes on the Algae of Swithland Reservoir, Leicestershire, N. Reynolds and F. J. Taylor, 49-55 ; 125 ; Species of Sphaerella at Leeds, H. Whitehead, 126.

Amphibia.—Y.N.U. Sectional Report, 1949, A. Hazelwood, 26

Amphipoda *Orchestia bottae* at Huddersfield, G. Fryer, 148

Biology (Freshwater).—Y.N.U. Sectional Report, 1949, H. Whitehead, 22-24 ; Circular Notes (Appendix), Malton, H. Whitehead ; Ripon, H. Whitehead ; Driffield, H. Whitehead ; Excursion records, Malton, H. Whitehead, 166-167 ; Ripon, H. Whitehead, 171 ; Winterburn and Hetton, H. Whitehead, 173

Birds.—Breeding birds of an area of Central Wales, W. M. Condry, 11-16 ; The Swallow (*Hirundo rustica* L.) and its arrival in Northumberland and Durham in 1949, C. J. Gent, 61-62 ; Gannets of Bempton, A. J. Wallis, 63-64 ; Winter Food of Robin, E. Stubbs, 102 ; Ornithological Report for Northumberland and Durham for 1949, G. W. Temperley, 109-125 ; Old record of Gannet nesting in Yorkshire, W. E. Glegg, 127 ; Spurn Bird Observatory Notes, W. A. Butterfield, R. Chislett and G. H. Ainsworth, 157-158 ; Y.N.U. Interim Ornithological Report, 1949, R. Chislett, 27 ; Committee for Ornithology Report for 1949, R. Chislett (Supplement to the April-June issue of *The Naturalist*) ; Circular Notes (Appendix), Malton, R. Chislett ; Ripon, R. Chislett ; Driffield, G. H. Ainsworth ; Bradfield, L. Carr ; Excursion records, Malton, R. Chislett, 165 ; Ripon, R. Chislett, 170 ; Winterburn and Hetton, J. P. Utley, 173 ; Driffield, R. Chislett, 174 ; Bradfield and Agden, C. V. Horrocks, 176

Book Reviews.—Allen, G. O.—British Stoneworts, 179
Ali, Sàlim.—Indian Hill Birds, 77
Atkinson, Robt.—Island Going, 39
Audubon's American Birds, 40
Bradbury, C. E.—Anatomy and construction, of the Human Figure, 80
Berrill, N. J.—The Tunicata, 129
Benson, R. B.—Natural History of British Sawflies, 180
Blunt, W.—Art of Botanical Illustration, 178
Browne, H. B.—Story of Whitby Museum, 43
Buxton, A.—Happy Year, 158
Buxton, John.—The Redstart, 65-66
Calman, W. T.—Classification of Animals, 42
Calvert, W. R.—Passions of the Wild, 80
Coe, R. L., Freeman, P. and Mattingley, P. F.—Diptera, Nematocera Families Tipulidae to Chironomidae, R.E.S. Handbook, Vol. 9, Pt. 2, 131
Country Life Ltd.—Wonders of Wild Life Photography, 132
Crompton, J.—The Spider, 131
Eales, N. B.—Littoral Fauna of Great Britain, 180
Ennion, E. A. R.—Adventurer's Fen, 43
Evans, I. O.—Observer's Book of British Geology, 79
Eyles, V. A., Simpson, J. B. and MacGregor, A. G.—Geology of Central Ayrshire, 79
Film Strips, 128
Gillham, E. H. and Holmes, R. C.—Birds of the North Kent Marshes, 130
Harrison, R.—Introduction to British Gulls, 158
Hill, C. A. Gibson.—Birds of the Coast, 40
Hosking, E. and Newberry, C.—Birds in Action, 39
Hutchinson, John.—Common Wild Flowers, 132
Huxley, Julian.—Bird Watching and Bird Behaviour, 78
Huxley, Julian.—Ants, 78
Hvidsten, A.—Old Caillie, 42
Irish Ordnance Maps, 44
Kerr, Sir John G.—Naturalist in the Gran Chaco, 177
Kimmins, D. E.—Plecoptera and Ephemeroptera, R.E.S. Handbook, Vol. 1, Pt. 6, and Vol. 1, Pt. 9, 131
Lowther, E. H. N.—A Bird Photographer in India, 77
Molony, E.—Portraits of Mountains, 180

Moore, W. G.—The Soil We Live On, 132
Pearsall, W. H.—Mountains and Moorlands, 159-160
Phillips, W. W. A.—Birds of Ceylon, 130
Photograms, 1950.—43
Praeger, R. Lloyd.—Some Irish Naturalists, 129
Robertson, T., Simpson, J. B. and Anderson, J. G. C.—Limestones of Scotland, 79
Rogerson, S. and Tunicliffe, C.—Both Sides of the Road, 41
Royal College of Science Publications, 44
Scott, Lorna I. and Priestley, J. H.—An Introduction to Botany, 42
Scott, R., Campbell, B. and North, F. L.—Snowdonia, 41
Shaw, H. K. A.—Directory of Natural History Societies, 80
Smith, S. B.—British Waders in Their Haunts, 77
Smith, D. Seth.—Mammals and Birds, 42
Smith, Stuart.—The Yellow Wagtail, 64-66
Stephen, David.—String Lug The Fox, 80
Stokoe, W. J.—Observers' Book of British Ferns, 179
Swinnerton, H. H. and Kent, P. E.—Geology of Lincolnshire, 78
Versey, H. C.—Geology and Scenery around Leeds and Bradford, 43

Botany (Flowering Plants).—The Changing Surface of the Tree, illustrated, Lorna I. Scott, 1-10 ; Early Yorkshire Botanists, W. E. L. Wattam, 60 ; Material for a Study of Trees Regeneration, Soil *p*H Determinations, A. M. Smith, H. Tordoff and E. Dearing, 71-72 ; History and Distribution of the Autumn Crocus (*Crocus nudiflorus* Sm.) in England, W. B. Crump and W. A. Sledge, 133-142 ; Saffron of Commerce and *Crocus nudiflorus* Sm., G. A. Nelson, 141-142 ; Upland Ecology (A Review of W. H. Pearsall's book 'Mountains and Moorlands'), W. A. Sledge, 159-160 ; *Luronium* (*Aeisma*) *natans* (L.) Raf., at Slaithwaite, G. Fryer, 160 ; Y.N.U. Sectional Reports, 1949, C. A. Cheetham, W. A. Sledge, D. Hilary, 32-37 ; Circular Notes (Appendix), Malton, C. M. Rob ; Ripon, C. M. Rob ; Driffield, R. Lewis ; Bradfield, J. Brown ; Excursion records, Malton, C. M. Rob, 167 ; Ripon, C. M. Rob, 171 ; Winterburn and Hetton, C. M. Rob, 173 ; Driffield, W. A. Sledge, 174-175 ; Bradfield and Agden, W. A. Sledge, 176

Coleoptera.—Y.N.U. Circular Notes (Appendix), Malton, W. D. Hincks ; Ripon, W. D. Hincks ; Corrections to records of Yorkshire Pselaphidae, E. J. Pearce, 142

Diptera.—Y.N.U. Sectional Report, 1949, C. A. Cheetham, 29-30 ; Circular Notes (Appendix), Malton, C. A. Cheetham ; Excursion records, Malton, C. A. Cheetham, 166 ; Ripon, K. G. Payne, 171 ; Northumberland Diptera Records, L. Parmenter, 56-59 ;

Ephemeroptera.—Mayflies Mistake, C. A. Cheetham, 10 ; Y.N.U. Sectional Report, 1949, J. R. Dibb, 30

Fish.—Sectional Report, 1949, A. Hazelwood, 24

Fungi.—Y.N.U. Sectional Report, 1949, J. Grainger, 38 ; Autumn Fungus Foray at Austwick, 1949, W. G. Bramley, 73-76 ; The genus Lactarius, illustrated, A. A. Pearson, 81-99 ; *L. Mairei* Malençon var. *zonatus* Pearson, n. var., spores figured and described, 100 ; *Russula cessans* Pearson, nov. sp., described and spores figured, A. A. Pearson, 101-102 ; *Gyromitra esculenta* (Pers.) Fr. at Salterhebble, H. Walsh, 126 ; Y.N.U. Bryologists at Pateley Bridge, H. Walsh, 127-128 ; *Bryum atropurpureum* W. & M., var. *gracilentum* Tayl. at Tong Park, J. Appleyard, 126 ; *Calypogeia meylanii* Buch. at Wath, R. Lewis, 126 ; Y.N.U. Circular Notes (Appendix), Ripon, W. G. Bramley ; Driffield, W. G. Bramley ; Spring Foray at Masham, W. G. Bramley, 161-164 ; Excursion records, W. G. Bramley, 169-170 ; Ripon, W. G. Bramley, 172

Geology.—Y.N.U. Circular Notes (Appendix), Malton, H. C. Versey ; Ripon, H. C. Versey ; Bradfield, W. H. Wilcockson

Hemiptera.—Y.N.U. Sectional Report, 1949, J. M. Brown, 31

Hymenoptera.—Y.N.U. Sectional Report, 1949, W. D. Hincks, 31-32

Lepidoptera.—Y.N.U. Sectional Report, 1949, E. Dearing, 28-21 ; Circular Notes (Appendix), Malton, W. D. Hincks ; Driffield, W. D. Hincks ; Excursion records, Ripon, J. P. Utley, 171

Lichens.—Identification of Lichens and Galloe's Natural History of Lichens, W. Watson, 17-19 ; Species noted in the Masham District, C. F. Rimington, 164

Mammalia.—Leisler's Bat in Essex, K. F. Burtsal, 19-20 ; Cave-dwelling Bats in Devonshire, illustrated, W. M. Hooper, J. H. D. Hooper and T. R. Shaw, 149-157 ; Y.N.U. Sectional Report, 1949, A. Hazelwood, 25-26 ; Circular Notes (Appendix), Ripon, J. P. Utley ; Driffield, E. Snaith

Memorial Notices.—Clifford Brown, B.Sc., Captain S. E. Evans, M.B.E., M.A., portrait (E. W. Taylor) ; William Bunting Crump, M.A., portrait (F. Beckwith and W. A. Sledge, 68-70

Myriapoda.—The Enemies of Myriapods, 103-108

Mollusca (Land and Freshwater).—Y.N.U. Sectional Report, 1949, E. M. Morehouse, 27-28 ; Circular Notes (Appendix), Malton ; Ripon, E. M. Morehouse ; Excursion records, Malton, E. M. Morehouse, 165-166

Mosses and Hepatics.—Y.N.U. Sectional Report, 1949, H. Walsh, 37-38 ; Circular Notes (Appendix), Malton, C. A. Cheetham ; Driffield, C. A. Cheetham ; Bradfield, J. Brown ; Excursion records, Malton ; A. Thompson, J. Appleyard and R. Lewis, 168-169 ; Ripon, A. Thompson, 171 ; Winterburn and Hetton, J. Appleyard, 174 ; Driffield, R. Lewis, 175 ; Bradfield and Agden, J. Appleyard, 177 ; Upper Teesdale Mosses, G. A. Shaw, 59 ; Sphagna on Austwick Moss, A. Thompson, 60

Neuroptera and Trichoptera.—Y.N.U. Sectional Report, 1949, H. Whitehead and J. M. Brown, 30-31 ; Circular Notes (Appendix), Malton, W. D. Hincks

Orthoptera.—Y.N.U. Sectional Report, 1949, J. M. Brown, 30 ; Circular Notes (Appendix), Malton, W. D. Hincks

Phenology.—Y.N.U. Sectional Report, 1949, W. E. L. Wattam, 24-25

Polyzoa *Plumatella fungosa* (Pallas) Colonies in Hornsea Mere, P. F. Holmes, 126

Reptilia.—Y.N.U. Sectional Report, 1949, A. Hazelwood, 26

Yorkshire Naturalists' Union.—The Changing Surface of the Tree, Presidential Address, 1949, by Miss Lorna I. Scott, 1-10 ; Annual Report, 1949, 21-38 ; Excursion Circulars (Appendix), Excursion Records, 165-177

CIRCULAR No. 502

Yorkshire Naturalists' Union.

President:
A. RAISTRICK, M.Sc., Ph.D., F.G.S., King's College, Newcastle-on-Tyne.

Hon. Treasurer:
S. D. PERSY FISHER, Sackville Street, Leeds, 7.

Assistant Treasurer:
Miss L. M. ANDERSON, 48 Denton Avenue, Gledhow, Leeds, 8.

General Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, via Lancaster.

The 502nd Meeting

WILL BE

The Sixth Spring Foray

TO BE HELD AT

MASHAM

For the Study of Micro Fungi

From APRIL 13th to 17th, 1950

Chairman : Mr. S. WEBSTER, Botany Dept., The University, Sheffield.
Recorders : Mr. W. G. BRAMLEY, Bolton Percy, York.
Dr. GRAINGER, Auchincruive by Ayr.
Secretary : Miss J. GRAINGER, Wilshaw, Meltham, Huddersfield.,

HEADQUARTERS.—Silverdale House, Masham, nr. Ripon. Terms 13/6 per day. Members and friends should write direct to Mrs. J. Parratt, Silverdale House, to reserve accommodation.

WORKROOM.—An excellent workroom is available at Headquarters. Members should bring their own books and microscopes.

The actual choice of itinerary will be left till the beginning of the meeting, but it is hoped to include Hackfall and Swinton Park as well as other suitable woodlands in the vicinity where fallen timber and general conditions facilitate the collection of Micro Fungi.

MAPS.—A good map is available in the New Grid Series and in the one-inch Ordnance Survey Sheet 21.

Beginners and advanced students will find much to interest them in this area.

The Next Meeting will be at Whitsuntide, May 27th-29th, 1950, at Malton, V.C. 62.

Circular No. 503

Yorkshire Naturalists' Union.

President:
A. RAISTRICK, M.Sc., Ph.D., F.G.S., King's College, Newcastle-on-Tyne.

Divisional Secretary:
K. G. PAYNE, A.R.C.S., B.Sc., West Dene, Manor Heath, Copmanthorpe, York.

General Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, via Lancaster.

The 503rd Meeting

WILL BE HELD AT

MALTON

From MAY, 27th to 29th, 1950

ACCOMMODATION.—Headquarters will be at the Talbot Hotel, Malton. Members should write to the Manager and book their accommodation *as soon as possible*.

TARIFF.—Terms are increased by 25 per cent. at Bank Holidays. Single Room and Breakfast, per night 13/- ; Packed Lunch 2/6 ; Afternoon Tea 1/9 ; Dinner 5/-.

The Divisional Secretary will try to help in the case of any difficulty, but accommodation is likely to be very scarce in Malton at Whitsun.

TRAVEL FACILITIES.—A private coach will leave the Talbot Hotel at 10 a.m. each morning to take members to the area chosen for the meeting, and will bring them back in the evening. The cost will be 3/- each per day.

Malton is readily reached by train or bus from York, Leeds and Scarborough, but members are reminded of the heavy holiday traffic to and from the coast.

AREAS TO BE VISITED.—Saturday, Terrington Carr, and neighbouring part of the Castle Howard Estate. Sunday, the Lake and other parts of the Castle Howard Estate. Monday, North Grimston.

PERMISSIONS.—Our thanks are due to the following for permission to visit their estates : Mr. George Howard, for the Castle Howard Estate ; Mr. Samuel Storey, for Settrington Woods ; and The Birdsall Estates Company, for extensive estates between North Grimston and Birdsall.

Will members please note that they should carry their membership cards and that dogs can be allowed on none of the excursions—an undertaking having been given the landowners to this effect.

PREVIOUS VISITS OF THE UNION.—1880 and 1916, Malton ; 1898, Terrington ; 1902, North Grimston ; 1926, Castle Howard.

The circulars and reports on these meetings are to be found in the appropriate volumes of *The Naturalist* and give a good deal of information about the area. In particular, the report on the 1916 meeting at Malton deals with features of Geology and Mr. H. B. Booth with the Vertebrates seen. Dr. Fordham contributed a note on 32 species of beetles obtained near the lower end of Crambe Beck. The Terrington circular of 1898 mentions that the graves of Robert Teesdale, Head Gardener at Castle Howard and father of the botanist, and of Richard Spruce, are at Terrington Church. Mr. John Wright noted that in the last (eighteenth) century the bittern was frequent but had disappeared since the drainage of Sheriff Hutton Carrs. The raven used to breed in the Mausoleum at Castle Howard, and that nesting place supplied living specimens to the hostelries at various points along the old York to Scarborough turnpike road. The report by the late Thomas Sheppard on the 1902 meeting at North Grimston is particularly worth reading. Mr. Kenneth Maclean recorded 46 species of bird seen in the day, and in an attractive account of the mollusca by the Rev. E. P. Blackburn is a list of 35 species of snail and slug seen. In both cases comparison with the 1950 lists will be interesting. In 1926 at the Castle Howard meeting Bell Bottom Wood and Terrington Carr were visited—the latter by only two members. Mr. M. L. Thomson noted 24 species of Coleoptera and Hemiptera.

GEOLOGY.—Dr. Versey writes of the Malton area : The district reveals a considerable amount of the Jurassic succession but most of the groups are attenuated compared with their development further north. Points worth examination include the Dogger at Terrington, the Millepore Limestone and Grey Limestone near Crambeck and the well-exposed Corallian sequence in the roadside and adjacent quarries at North Grimston.

FLOWERING PLANTS.—Miss C. M. Rob writes : Castle Howard is well known as a botanical district of particular richness, though drainage and the hand of time with its advances in agriculture have left many scars, the report of the Union's last meeting there records that many of the plants listed in the Circular were not seen, especially at Terrington Carr.

This once famous locality, formerly the home of *Gentiana Pneumonanthe* L., *Utricularia minor* L., *Rhynchospora alba* (L.), Vahl and *Carex limosa* L. was drained *circa*. 1860, and is now a shadow of what it was. *Drosera longifolia* L. still survives, *Oxycoccus quadripetalus* Gilib., *Pyrola minor* L., *Narthecium ossifragum* (L.) Huds., a very odd form of *Carex disticha* Huds. and *C. lasiocarpa* Ehrh. are other recent records.

The lake at Castle Howard should be of interest, here may be found *Nymphoides peltatum*, introduced in this station by Teesdale, *Acorus calamus* L., *Rorippa islandica* (Oeder) Borbas. *Eleocharis acicularis* (L.) Roem & Schult. and *Pilularia globulifera* L. A single specimen of *Potamogeton friesii* Rupr. was found washed up on the north shore some years ago, and a lookout should be kept for further material. Some other plants recorded from the Castle Howard and Coneysthorpe area are *Helleborus viridis* L., *Melandrium noctiflorum* (L.) Fr., *Geranium pyrenaicum* Burm. f., *Trifolium striatum* L. (Ganthorpe), *Bidens cernua* L., *Campanula glomerata* L., *Specularia hybrida* (L.), A.DC. *Artemesia absinthium* L., *Potamogeton alpinus* Balb., *Poa compressa* L. and *Equisetum hyemale* L. This last-named plant has gone from many of its recorded stations that it would be particularly interesting to confirm its status in this station.

Diplotaxis tenuifolia (L.) DC. is plentiful on the walls at Old Malton Priory. *Rorippa amphibia* (L.) Besser. and *R. sylvestris* grow by the Derwent near Malton ; also in the river at Malton and nearby is a form of *Potamogeton pectinatus* L. with very wide leaves, which has at times been mistaken for *P. compressus* L. Some plants recorded for the area around North Grimston include *Hippocrepis comosa* L. and *Antennaria dioica* (L.) Langton Wold, *Ranunculus parviflorus* L. and *Allyssum alyssoides* (L.) L. Wharram ; the latter has not been noted for some years, *Caucalis nodosa* (L.) Crantz., *Cirsium eriophorum* (L.) Scop., *Astragalus danicus* Retz., *Geranium pyrenaicum* Burm., *Bromus erectus* Huds. and *Avena pubescens* Huds.

MOSSES.—Mr. C. A. Cheetham writes : The mosses of the area have been carefully worked ever since Dr. Spruce recorded *Paludella squarrosa* for Terrington North Carr in 1842. With it *Thuidium Blandovii* was found, but both were lost when this Carr was drained in 1860. The possibility of survival in some obscure corner must still be remembered. It will be interesting to note which of the modern species of Thuidium the *T. recognitum* mentioned by Mr. M. B. Slater will now be regarded to represent.

GENERAL ENTOMOLOGY.—Mr. W. D. Hincks writes : Malton is situated in the midst of excellent country for the entomologist. The valley of the Derwent is particularly attractive in this respect and has not been much explored in recent years. The late G. T. Porritt collected extensively in the Castle Howard district and the many recorded Trichoptera and Lepidoptera testify to his skill and to the richness of the fauna. Among the Neuroptera the large, rare lacewing, *Osmylus fulvicephalus* (Scop.) may be mentioned as being abundant at Castle Howard and the related *Sisyra fuscata* (F.), a small lacewing whose aquatic larva feeds on fresh-water sponges, also occurs there. For Caddisflies this lovely valley must be a veritable paradise judging from the records, and where Caddisflies are abundant the conditions are usually suitable for many interesting Stoneflies and Mayflies also. The Hymenoptera of the district are not well worked and interesting species may easily be added to the county list. The Coleoptera, too, though better known than the Hymenoptera, are not so well worked in this area as the Lepidoptera and Neuropteroid orders which were Porritt's favourite groups. The date of our visit, however, will coincide with the best time of the year for beetles and collecting by the riverside, under stones and shingle, under bark of dead trees, in flood refuse and by sweeping should be very productive indeed. It will be much too early in the season for Orthoptera, but it may not be too early to see both our delightful Demoiselles, *Agrion virgo* (L.), *A. splendens* (Harris), which are abundant in the woods by the riverside near Castle Howard.

DIPTERA.—Mr. C. A. Cheetham writes : In *The Naturalist*, 1927, p. 59, it is stated Dr. F. W. Edwards made a collection of Chironomids, many being additions to the British Museum collection. A list of them is added.

FRESHWATER BIOLOGY.—Mr. H. Whitehead writes : Thirty-seven species of Trichoptera have been recorded from the Castle Howard district. Many of these records are over 50 years old, so the ground is well worth working again. There are no records of Ephemeroptera and Plecoptera and it may be assumed that conditions are favourable for the development of these insects. Terrington Carr should prove interesting and the stream at North Grimston is worth attention.

ORNITHOLOGY.—Mr. Ralph Chislett writes : Malton will be new as spring-time headquarters for a Y.N.U. week-end meeting to many members ; although the areas immediately around and north of Castle Howard have been visited from Slingsby fairly recently. This time we shall be able to visit other parts of the Estate as well as to renew acquaintance with the birds about the lake. The woodlands will no doubt show creepers, nuthatches, and woodpeckers (possibly all three). A careful watch should be kept for the woodlark, which bred in 1949, both north-west and south of the area ; and of which further information as to present distribution is desired—some of the ground is eminently suitable. Finches and Warblers should be fairly numerous—the Reed-Warbler is possible. At North Grimston it will be interesting to see if such typical birds as Tree-Sparrow and Corn-Bunting are as noticeable at this north-east corner of the Wolds as they are farther south. In a varied terrain, the meeting promises opportunity to extend our knowledge of distribution of Yorkshire birds and of species, of which I expect the list obtained will be a good one. The Committee will be officially represented.

MONDAY TEA AND MEETING.—Tea at Headquarters at 5 p.m. on Monday will be followed by a meeting for the presentation of Sectional Reports and for the election of new members. Any member not staying at Headquarters, who wants tea on Monday, should notify the Divisional Secretary not later than Saturday.

CIRCULAR No. 504

Yorkshire Naturalists' Union.

President:
A. RAISTRICK, M.Sc., Ph.D., F.G.S., King's College, Newcastle-on-Tyne.

Divisional Secretary:
C. M. ROB, F.L.S., Catton, Thirsk.

General Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, via Lancaster.

The 504th Meeting

WILL BE HELD AT

RIPON

For the Bank of the River Ure at Hutton Conyers and Nunwick

V.C. 64 and 65

On SATURDAY, JUNE 10th, 1950

HEADQUARTERS.—The Old Deanery Private Hotel (opposite the Cathedral) High Tea, price 4/6 per head.

The hotel is some distance from the ground to be visited, and members with cars are asked to convey non-car owners to the railway station, where there is adequate parking space.

TRAVEL ARRANGEMENTS.—TRAINS. The summer service will be in operation and the times given below should be verified.

	a.m.		p.m.
Leeds (City) ...	dep. 9-17	Ripon	dep. 6-24
Ripon	arr. 10-11	Leeds (City) ...	arr. 7-17
Northallerton ...	dep. 9-33	Ripon	dep. 8-51
Ripon	arr. 10-15	Northallerton ...	arr. 9-28

BUS TIMES.—There is a half-hourly bus service from Harrogate to Ripon at 5 and 35 minutes past the hour, returning to Harrogate at 24 and 54 minutes past every hour.

The Limited Stop Leeds-Middlesbrough bus :

	a.m.		p.m.
Leeds	dep. 8-35	Ripon	dep. 7-48
Ripon	arr. 9-48	Leeds	arr. 9-3
Limited Stop Leeds-Newcastle :			
Leeds	dep. 9-35	Ripon	dep. 7-35
Ripon	arr. 10-48	Leeds	arr. 8-30
Ripon-York. United :			
York	dep. 9-0	Ripon	dep. 6-30
Ripon	arr. 10-17	York	arr. 7-47

[P.T.O.

MAPS.—Sheet 21, 1-inch Ordnance Map covers all the area. (Ripon-Northallerton.)

ROUTE.—Meet Headquarters 10-30, proceed to North Bridge, follow East bank of River Ure to Nunwick. Return by road through Hutton Conyers.

PERMISSION.—Permission to visit the area has been given by J. F. Graham, Esq., and H.Q. Northern Command.

Members are reminded that *no dogs* may be brought on the ground to be visited, and are requested to be particularly careful not to distrub game or leave gates open.

The boundary between Vice-Counties 64 and 65, which is also the Riding boundary at this part, does not follow the river, and will be crossed several times during the course of the day. The first part consists of grassland, occupied by the War Dept. Near Hutton Conyers is a plantation of Cricket Bat Willows. Here one of the Norton Conyers Estate foresters is meeting the party to show interested members the trees. From here there is a fairly extensive area of shingle, colonised by Willow scrub, which should be of interest to Ornithologists and Entomologists.

There is some wet woodland, very overgrown waste ground, and there used to be some good ponds, though these may have been filled in.

BOTANY.—C. M. Rob, F.L.S. and Mrs. Worsley : The flora of the first fields has suffered from the occupation of the area as a military camp, but once the wet ground at Nunwick is reached there should be a more time for the botanists. The Cricket Bat Willow is cultivated in parts of the marsh. *Thalictrum flavum* L., *Hesperis Matronalis* L., *Ranunculus scleratus* L., *Mimulus guttatus* DC., *Cerastium arvense* L. (by the river), *Hippuris vulgaris* L. are all recorded from the area. *Orchis ustulata* L. grows near by. *Mentha gentilis* L. and *M. spicata* L. grow on the shingle beyond the marsh. There is a pond at Hutton Conyers with *Oeanthe aquatica* and *Epilobium obscurum* Schreb.

Astragalus glycyphyllus L., *Iris foetidisma* L. and *Carex Pseudo-cyperus* L. are recorded from Nunwick, but there is no recent confirmation of the records.

Potamogeton suecicus Richt. grows in the River Ure from Masham to Langthorpe. There is a good bed of this interesting hybrid near the bridge at Ripon and should be found all along the part to be examined.

MYCOLOGY.—W. G. Bramley : The area to be visited has not been worked mycologically before, but notes of species likely to be found are in the reports of the Y.N.U. Meetings at Tanfield, *The Naturalist*, 1935, and Queen Mary's Dubb, *The Naturalist*, 1939. There will be little of the larger fungi to be obtained, and attention should be given to the Uredines and Microscopic Saprophytes.

FRESHWATER BIOLOGY.—H. Whitehead, B.Sc. : From the records of species taken between Ripon and Tanfield, the district appears to possess a good typical fauna of Trichoptera (Caddisflies) and Ephemeroptera (Mayflies).

It would be well worth while for entomologists to keep a lookout for specimens of *Ecdyonurus forcipula* (Pict.) as its inclusion in the British list is tentative and rests upon nymphs only. Messrs. Hincks and Dibb took a late instar nymph in the River Skell at Ripon in August, 1935. In Germany it occurs on the wing from June to September and if climatic conditions are favourable there is a possibility of the sub-imago or imago being taken. The imago strongly resembles that of the Great Red Spinner [*Ecdyonurus venosus* (Fabr.)].

The Plecoptera (Stoneflies) have received very little attention in this neighbourhood and the few existing records are old ones. Specimens of even common species would be welcome for determination.

It is hoped to visit some ponds near Nunwick and if they are in similar condition to those visited by the Union in 1939 at Queen Mary's Dub on the opposite bank of the river, a thorough investigation would be interesting and profitable.

MAMMALIA.—J. P. Utley, B.Sc. : In such country as that covered by this excursion a considerable record of mammals must not be anticipated. Due to the increase in the area of land under cultivation, that is land turned by the plough from permanent pasture and meadow, and to the spoliation of woodlands, the animal population is much smaller in species and quantity than formerly.

The antics of Red Squirrels between Hutton Conyers and Nunwick, and also the stealthy movements of Badgers in the neighbourhood of Sloe Wood have been recorded within the past twenty years.

Grey Squirrels may be seen and the rousing of a Fox is not improbable. Rabbits and Hares with the sometime attendant Stoat or Weasel may appear and also the Brown Rat, as well as two or three varieties of mice. Those who walk quietly by the river may, if lucky, spot an Otter, while the widening circles of water waves may mark the submergence point of a Water Vole.

ORNITHOLOGY.—R. Chislett, M.B.O.U. : The bushy area by the Ure it is proposed to visit on June 10th, will be interesting to explore. Probably the Willow-Warbler will be the most numerous species, but other Warblers will be there, possibly including the Grasshopper and Sedge Warblers. Of riverside birds I have seen there the Dipper, Sand-Martin, Grey Wagtail, Kingfisher and Sandpiper and in June they should have eggs or young. Herons come there to feed and Moorhens will be in evidence and others of the commoner species. It will not be too late to hear and learn the notes of the Redstart, Tree-Pipit, Warblers, etc. Pied Flycatchers and Woodpeckers occur across the river and above Tanfield. Most field ornithologists will be busy with their own investigations at that time ; but the meeting and place will offer an opportunity for some to extend their avian ecological experience.

CONCHOLOGY.—Mrs. E. M. Morehouse : During the Ripon Meeting, 1933, the following species of molluscs were observed by the River Ure and the surrounding area : *Limax maximus* (L.), *Vitrea pura* (Alder), *V. radiatula* (Alder), *V. nitidula* (Drap.), *V. rogersi* (Woodward), *Vitrina pellucida* (Müll.), *Euconulus fulvus* (Müll.), *Pyramidula rotundata* (Müll.), *Hygromia rufescens* (Penn), *H. fusca* (Montagu), *H. hortensis* (Müll.) and vars. *Cochlicopa lubrica* (Müll.), *Carychium minimum* (Müll.), *Jaminea cylindracea* (Da Costa), *Clausilia bidentata* (Strom.), *C. laminata* Montagu.

ENTOMOLOGY.—W. D. Hincks, F.R.E.S. : The Ripon district is an excellent area for the entomologist, in fact it is almost ' holy ground ' to the coleopterist. E. A. Waterhouse, one of the two famous coleopterist sons of G. R. Waterhouse of the British Museum, collected in the district in the 1870's, discovering many interesting species several of which are still unique as Yorkshire records. Some have been rediscovered by members of the Entomological Section of the Union in the Skell Valley, near North Stainley, and at Tanfield ; others still await confirmation. Waterhouse's records are usually quoted in the standard works on Coleoptera as from Ripon, but they are correctly listed from Studley in Bayford and Thompson's invaluable list of Yorkshire beetles in the *Victoria County History*.

The proposed route for the excursion will take entomologists into the best type of country for other orders of insects besides Coleoptera. Near the River Ure and its tributaries attention should be particulary directed to the Stoneflies, Mayflies and Caddisflies, all of which are exceptionally well represented. Practically nothing is known of the parasitic Hymenoptera of the area, but some interesting Aculeates and Sawflies have been recorded. Careful collecting is certain to produce insects of special interest in all orders in such a rich and varied countryside.

In addition to the *Victoria County History*, reference may be made to the following reports in *The Naturalist* : 1933, pp. 230-7 ; 1934, pp. 10, 253-4 ; 1935, pp. 189-91 ; 1940, pp. 106-8.

GEOLOGY.—H. C. Versey, D.Sc., F.G.S. : The area to be examined occurs near the junction of Permian and Triassic Rocks. Near this junction is a thick bed of gypsum which has been locally dissolved with consequent collapse of the surface. The result of this is seen in many holes with red sandstone walls near the station. There are few exposures of solid rocks but interesting examples may be seen of river erosion and deposition.

A meeting for the election of New Members and presentation of reports by the various sections will follow the tea at 6 p.m. at the Old Deanery Private Hotel (opposite the Cathedral).

CIRCULAR No. 505

Yorkshire Naturalists' Union.

President:
A. RAISTRICK, M.Sc., Ph.D., F.G.S., King's College, Newcastle-on-Tyne.

Divisional Secretary
W. G. BRAMLEY, Bolton Percy.

Hon. Treasurer:
J. D. HARTLEY, Linton Avenue, Boston Spa.

General Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, via Lancaster.

The 505th Meeting

WILL BE HELD AT

WINTERBURN AND HETTON

On Saturday, JUNE 24th, 1950

HEADQUARTERS.—The Angel Inn, Hetton, via Skipton. Mrs. Wm. Anderson.

THE DISTRICT.—The ground to be investigated is mainly at Winterburn owing to the difficulty of access it has never been visited by the Union. It lies between two parts of Craven—Malham and Grassington—that are very attractive and consequently so often visited and owing to this it has been neglected by naturalists. It is suggested that the Skipton-Malham bus should be taken to Winterburn Road end, Eshton, and this road followed to Winterburn (about a mile and a half in distance), it passes St. Hellen's Well and the fine old seventeenth century house, Friars Head. As Winterburn is reached, the sweet-scented Cicely, *Myrrhis odorata*, will be seen in plenty together with much of the less-pleasing Garlic, *Allium ursinum*, on which the uncommon Hoverfly, *Chilosia maculata* Fln. will probably be noted. The woods and deep gills at Winterburn will provide opportunity for botanists and entomologists who could then follow the road to Hetton or go forward to the reservoir bank and via Long Hill Farm to Hetton Green Lane.

Ornithologists who wish to visit the reservoir (the fishing is private and let to an Anglers' Club) could get there most conveniently by the Skipton-Grassington bus, getting off at Hetton Bridge and taking the Hetton Green Lane on the right at the further end of the village, then past Long Hill Farm to the embankment. The stream which comes from Bordley may provide interesting ground and a return could be made from Lainger House to Hetton.

PERMISSION to visit his estate has been kindly given by Mr. P. W. S. Fletcher of Winterburn Wood and his keeper, E. Stoney has promised assistance. The Docks' & Inland Waterways have given us permission for the reservoir through Mr. A. Bateman of Skipton.

Members will please note that no dogs must be taken on the excursion and we have undertaken to avoid disturbing game in the woodlands.

TRAVEL FACILITIES.—At present the winter season service is as follows but probably additional buses will be added. The Skipton bus for Eshton leaves at 9-30 a.m. (the next is 12-25 p.m.). If members intending to go on the 9-30 will notify the Secretary at Austwick it may be possible to get extra accommodation provided at Skipton. This bus goes via Gargrave and can be joined there. The bus to Hetton Bridge is on the Skipton-Grassington or Skipton-Buckden routes on which there is a frequent service.

For the return journey the 5-37 p.m. from Hetton Bridge runs to the Railway Station at Skipton and again extra accommodation could be possibly arranged if the Secretary is notified of intending passengers. There is a hourly service to Skipton Town.

The following note on the plants was sent by Mr. Norman Frankland in response to an enquiry : ' I find in notes in my diary the following entry for August— " Plants seen at Winterburn Reservoir. *Pulicaria dysenterica* Gray (Flea-bane). *Cirsium heterophyllum* Hill. (Melancholy Thistle). *Parnassia palustris* L. (Grass of Parnassus). *Habenaria conopsea* Br. (Clove Orchis). *Orchis Fuchsii* Druce (Spotted Orchis). *Sagina nodosa* L. (Knotted Pearl-wort). *Primula farinosa* L. (Birds-eye Primrose). *Equisetum maximum* Lam. (Great Water Horse-tail)." '

Mr. E. Stoney, the Keeper, who will be with us on the excursion, says that Primroses and Cowslips are there with the hybrid, the Oxlip. He also says that the Great Spotted and the Green Woodpeckers are there and that the Great Crested Grebe has been seen on the reservoir. He has also recently seen an Oystercatcher in the district. Mr. A. Pilkington says that this winter he saw a large flock of Wigeon, some Mallards and a few Heron on the reservoir.

A note from Mr. R. G. Procter, of Cracoe, gives a clue to the age of the reservoir and a possible longer walk. ' If members of the Union had time, they might think it worth while to go up the fields on the west side of the bridge at the head of the reservoir, along a somewhat zig-zagging path to Hetton Common Head for a pretty extensive view. Low Cowhouse used to stand on the floor of the reservoir. I remember watching the furniture being carted out before they let the reservoir fill up ; I think it was about 1887.'

TEA and MEETING.—For the convenience of those members who wish to get the 5-37 bus the tea has been arranged at the Angel Inn at 4-30 p.m. and this will be followed by a Union Meeting to elect new members and to hear reports from the sections on the result of the day's outing.

TEA with chicken or ham at 4/6 or a plain tea at 2/- will be available but members will help if they notify the Secretary by a postcard in time for arrangements to be completed.

CIRCULAR No. 506

Yorkshire Naturalists' Union.

President:
A. RAISTRICK, M.Sc., Ph.D., F.G.S., King's College, Newcastle-on-Tyne.

Divisional Secretary:
Miss F. E. CRACKLES, B.Sc., 28 Devon Street, Hull.

General Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, via Lancaster.

Hon. Treasurer:
J. D. HARTLEY, Linton Avenue, Boston Spa.

The 506th Meeting

WILL BE HELD AT

DRIFFIELD

For King's Mill and Kelleythorpe

On SATURDAY, JULY 8th, 1950

HEADQUARTERS.—Rose Garth Guest House, St. John's Road, Driffield (two minutes walk from Railway Station). The proprietress, Miss Atkinson, will provide High Tea, price 5/6 per head, or a lighter meal (sandwiches and cakes) at 3/6 per head. Will those requiring tea please send a post card to Miss Atkinson, to reach her not later than Wednesday, July 5th.

Members requiring accommodation should write as soon as possible. Terms: Bed and breakfast, 12/6.

TRAVEL FACILITIES.—Times given below should be verified.

TRAIN SERVICE:

	a.m.	a.m.		a.m.		a.m.
Hull	9 0	10 10	Leeds	8 25	Scarborough	8 53
Driffield	9 34	10 43	Selby	9 20	Driffield	10 6
			Driffield	10 32		
	p.m.			p.m.		p.m.
Driffield	6 50		Driffield	7 14	Driffield	6 26
Hull	7 31		Selby	8 36	Scarborough	7 49
			Leeds	9 38		

(Times given for the Hull to Scarborough route are for Saturdays only).

BUS SERVICE:

	a.m.	a.m.		a.m.	a.m.
Hull	8 55	9 25	Scarborough	8 15	8 45
Driffield	10 0	10 30	Driffield	9 50	10 20
	p.m.	p.m.		p.m.	p.m.
Driffield	6 20	6 50	Driffield	6 30	7 0
Hull	7 23	7 53	Scarborough	8 5	8 35

[P.T.O.

MEETING PLACE.—Outside Headquarters at 10-30 a.m. Will those travelling from Leeds and Selby on Saturday morning and others who cannot arrive in Driffield until late, please communicate with the Divisional Secretary.

ROUTE.—It is proposed to proceed to King's Mill, where the marshy ground in the vicinity may be investigated. The main aim of the excursion, however, is to examine the Kelleythorpe area. Proceed from King's Mill to Little Driffield Gate House and by road to Kelleythorpe.

The springs arising from the chalk and the marshy ground resulting together with swift flowing trout streams furnish interesting habitats for investigation.

From Kelleythorpe the Eastburn beck will be followed to the bridge at Sunderlandwick.

Most workers will require all the available time to investigate one or both of the above-mentioned areas, and can return to Headquarters by road from Sunderlandwick.

Those whose interests allow a greater distance to be covered may follow the beck to Poundsworth Mill and along the south of the river to Bell Mills. If any members desire it, arrangements can be made to visit the fish hatchery at Poundsworth. Will those wishing to do so, please communicate with the Divisional Secretary.

PERMISSIONS.—Permission to investigate marshes, etc., on their land has kindly been given by Mr. L. H. Downs, M.A. (King's Mill) and Mr. H. J. A. Hopper (Kelleythorpe Farm). Mr. L. Thompson (Poundsworth Farm) and Mr. P. Bradshaw (Bell Mill) have also given permission for members to cross their land.

Mr. Hopper informs me that much of the old happy hunting grounds at Kelleythorpe have been ploughed up. Members are asked to be particularly careful to show great respect for cornfields and to leave no gates open here, as elsewhere.

MAP.—The one-inch Ordnance Survey Map, New Popular Edition, Sheet 99, includes the area to be visited.

PREVIOUS VISITS OF THE UNION.—May 26th, 1890, July 8th, 1899, July 8th, 1916, August 3rd-5th, 1929, July 8th, 1939. Consult Y.N.U. Circulars Nos. 84, 145, 266, 350 and 419. Also see reports of excursions in *The Naturalist* for September 1916, January 1930, and November 1939.

Both the King's Mill and Kelleythorpe areas were examined in 1916. In 1939 rain prevented a thorough examination of Kelleythorpe. The report of the 1929 Excursion includes information obtained over a much greater area. The Circulars and reports on these meetings give a good deal of information about the area, and frequent reference to these will be found in the notes to follow. Some other notes are worthy of special mention.

The late Mr. T. Stainforth gave a general note on the district in the 1939 Circular. In *The Naturalist* for November, 1939, page 296, find a list of plants recorded by Dr. W. A. Sledge for King's Mill and an interesting note concerning Carex sp. found at Kelleythorpe. A note by Professor W. H. Pearsall on the ecology of the Driffield area which appeared in the excursion report in *The Naturalist* November, 1939, is well worth reading.

FLOWERING PLANTS AND FERNS.—Mr. R. Lewis gives the following list of plants recorded recently for Kelleythorpe and worthy of mention :

Ranunculus Lingua L. One very good patch.
Fumaria parviflora L. First recorded from a cornfield on the edge of the Marsh in 1949.

Sagina nodosa (L.) Fenzl.
Comarum palustre L.
Parnassia palustris L.
Callitriche sp.
Sium erectum Huds.

Campanula glomerata L.
Menyanthes trifoliata L.
Linaria minor (L.) Desf., on railway.
Veronica agrestis L., in cornfield on edge of Marsh.
Pedicularis palustris L.
Lycopus europaeus L.
Lamium amplexicaule L., in cornfield on edge of Marsh.
Salix pentandra L.
Listera ovata (L.) R. Br.
Orchis latifolia L. sec. Pugsl. det. V. S. Summerhayes of Kew.
Triglochin palustris L.
Potamogeton coloratus Hornem.
Blysmus compressus (L.) Link.
Carex disticha Huds.
C. paniculata L., forming huge tussocks.
C. flacca Schreb.
C. tumidicarpa Anderss.
C. hirta L.
C. riparia Curt.
C. rostrata Stokes.
C. vesicaria L.
Ophioglossum vulgatum L.
Dryopteris spinulosa (Mull.) Warr, rare elsewhere in the East Riding.
Thelypteris palustris Schott, abundant.
Equisetum fluviatile L.

Schoenus nigricans L. is recorded for this marsh, but has not been found in recent years.

MOSSES.—Mr. C. A. Cheetham, F.R.E.S., writes: The list known from Driffield is mostly common species, and this should be increased. The following is a list of those noted in 1939: *Fontinalis antipyretica* L., *Eurynchium rusciforme* Milde, *Amblystegium filicinum* De Not., *Eurynchium swartzii* Hobk., *E. praelongum* Hobk., *Amblystegium serpens* B. & S., *Brachythecium velutinosum* B. & S., *Tortula muralis* Hedw., *Funaria hygrometrica* Sibth., *Bryum pallens* Sw., *Barbula cylindrica* Schp., *Webera carnea* Schp., *Hypnum cupressiforme* L.

FUNGI.—A long list of fungi recorded in 1939 is to be found in *The Naturalist*, 1939, page 296. Mr. W. G. Bramley writes: Reference to the above mentioned report will show that most of the species collected were micro fungi, chiefly Rusts and Smuts. It will be interesting to see how this eleven-year-old list will compare with this year's provided as much time is devoted to their collection. Little is to be expected from the Agarics, but search for Resupinates, Hyphomycetes Discomycetes and Pyrenomycetes should prove profitable.

VERTEBRATES.—The following note concerning vertebrates occurring at Kelleythorpe was compiled from information kindly given by Mr. E. Snaith, the gamekeeper for Kelleythorpe and Elmswell:

Hares and rabbits are plentiful. Otters and badgers visit the area occasionally, a badger's sett being present at Cottam. No red squirrels are present, and the grey squirrel is only seen occasionally. Stoats and weasels are very common, being apparently attracted by the becks. And, as one would expect, water voles are plentiful.

The keeper has only seen one grass snake at Kelleythorpe during thirty-five years.

ORNITHOLOGY.—Mr. G. H. Ainsworth writes: Although the Driffield district in general and the Kelleythorpe area in particular, has an interesting ornithological record, early July can hardly be expected to be very productive for bird watching. However, a walk by the side of the streams of the district in past years has shown that Snipe, Dabchicks, Redshanks, Kingfishers, Waterhens, Coots, Mallards and Shovelers may be expected to be seen.

Hawfinches, Goldfinches, Lesser Redpolls, Bullfinches and Tree Sparrows are known to nest in the neighbourhood.

The Yellow Wagtail frequents the edge of the cornfields of the plain. Marsh Tits and Willow Tits have both been seen near Kelleythorpe. The Corn Bunting is not uncommon.

Garden Warblers and Blackcaps nest in the copses, and where blackthorn is thick the Lesser Whitethroat has been found to build, although last year this species appeared to be scarce in the Riding.

Green, Greater Spotted and Lesser Spotted Woodpeckers have been seen around Driffield. The Little Owl, the Barn Owl and Tawny Owl are not rare, and with the apparent increase of the Long Eared Owl in the Pine woods of the East Riding a sight of this species may be hoped for.

Turtle Doves now nest in the Driffield area. Woodpigeons and Stock Doves may be heard. Quail have bred here during the past few years.

Unfortunately the time of the year may cause many ornithologists to expect little of interest, so perhaps it would not be out of place to say that a few years before the war the writer was assured by a man who had a thorough knowledge of birds that he shot a male and female Bearded Tit on one of the waters near Driffield for a ' gentleman ' who took the nest and the birds for his collection !

FRESH WATER BIOLOGY.—An interesting note on the fauna of the Driffield Trout Stream will be found in the 1939 Circular.

Mr. H. Whitehead, B.Sc., writes pointing out that information given in the 1939 Circular applied to the stream as it was in 1930. Many changes may have taken place since then, as a trout stream is a very unstable unit. The invertebrate fauna is being constantly removed and fresh supplies of insect larvae added. In addition the flora of the stream and its banks is changing.

ENTOMOLOGY.—Mr. W. D. Hincks, F.R.E.S., writes : The last time the Union visited Driffield the entomologists had nothing to report, having been defeated by adverse weather (see *Naturalist*, 1939, 296-298). The Circular for that excursion (No. 419), however, contains some interesting notes on the fresh-water insects by Mr. H. Whitehead, and should be consulted. The best accounts of the various orders in the general area of Driffield is contained in the British Association Handbook to Hull and the East Riding of Yorkshire, 1923. In *The Naturalist*, 1930, 21-22, Mr. J. M. Brown and the late Miss E. M. Pilkington gave a good list of Plant Galls, and on pp. 23-25 Mr. Brown contributed an account of the insects including a specially interesting list of Hemiptera. A number of Lepidoptera have been recorded from Driffield, but Coleoptera appear to have been neglected and only a few common species have been noted.

The area to be visited should be very productive for the entomologist, being one corner of a square of famous insect country bounded by Bridlington, Hornsea, Beverley and Driffield.

MEETING AND TEA.—Tea will be provided at Rose Garth Guest House at 5 p.m. A meeting for the election of new members and for presentation of reports by the various sections will follow.

CIRCULAR No. 507

Yorkshire Naturalists' Union.

President:
A. RAISTRICK, M.Sc., Ph.D., F.G.S., King's College, Newcastle-on-Tyne.

Divisional Secretary:
Miss J. GRAINGER, Meltham, Huddersfield.

General Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, via Lancaster.

Hon. Treasurer:
J. D. HARTLEY, Linton Avenue, Boston Spa.

The 507th Meeting

WILL BE HELD AT

BRADFIELD

for the investigation of Agden Reservoir, Agden Dyke and the vicinity

On Saturday, JULY 22nd, 1950

CHANGE OF DATE.—Members will note this is not as on the cards.

LEADER.—Mr. J. Brown, 16 Stafford Road, Sheffield 2.

TRANSPORT.—Sheffield is easily reached by train or by bus. A bus will leave Sheffield (City Hall) at 10 a.m., arriving at Bradfield 10-30 a.m. Members wishing to make use of this bus should write to Mr. J. Brown. The bus will collect the party and convey them to Strines Inn for tea.

TEA.—Mrs. Willis, Strines Inn, will provide tea at prices ranging from 2/6 to 3/6 per person.
The bus will leave Strines at 6 p.m., arriving Sheffield at 7 p.m.

ROUTE.—Smallfield and the old road to Agden, Agden Dyke, Agden Bridge, returning by moorland road to Agden House and Windy Bank lane.

PERMISSION.—The Sheffield Corporation Waterworks Dept. have given permission to visit the area through the kindness of the Chief Engineer, Mr. Noel Wood.

MAP.—The area is on the 1-in. (6th Ed.) Ordnance Map, Huddersfield 102.

AREA NOTES.—Mr. John Brown writes : This lies some two miles north-west of Low Bradfield and includes moor, bog and stream. The botany of the district is typical of Gritstone areas and plants of sand and peat-loving type occur.

The most interesting spot is a small bog that lies a little to the north-west of the neck of Agden reservoir and includes several plants that are rare in the district : *Hypericum elodes* L., *Drosera rotundifolia* L., *Scutellaria minor* Huds., *Pinguicula vulgaris* L., *Anagallis tenella* (L.) Murr., *Potamogeton polygonifolius* Pourr., *Oxycoccus quadripetalus* Gibb. The occurrence still of *Umbilicus pendulinus* syn. *Cotyledon umbilicus* at Bradfield is most noticeable, it was known here by J. Salt in 1803. Mosses here include *Hypnum stellatum* Schreb., *H. revolvens* Swartz., *H. stramineum* Dicks., *H. molluscum* Hedw., *Philonotis fontana* Brid., *Aulacomnium palustre* Schwaeg., *Dicranella cerviculata* Schp., *Mnium subglobosum* B. & S., *Rhacomitrium aciculare* Brid., etc.

Agden Dyke, a narrow clough whose stream is a feeder from the watershed of Broomhead Moors is wooded in its lower slopes, birch being the dominant tree with some oak and mountain ash. The fairly steep slopes provide wet places at their base and the most notable plants of such habitats are *Crepis paludosa* (L.) Moench., *Narthecium ossifragum* (L.) Huds., *Carex tumidicarpa, C. laevigata* Sm., and in drier sites *C. pilulifera* L. and *Lycopodium clavatum* occur.

Mosses : *Schistostega osmundacea* Mohr., the luminous moss, finds a home in the sandy hollows of the banks. The most notable moss of the stream is *Catharinea crispa* James., its superficial likeness to the common *Mnium hornum* L. may be noted. Other mosses in the vicinity are *Leptodontium flexifolium* Hampe., *Leucobryum glaucum* Schp., *Pleuridium subulatum* Rab., *Polytrichum aloides* Hedw., *P. piliferum* Schreb., *Oligotrichum hercynicum* Lam., *Campylopus flexuosus* Brid., *Webera nutans* Hedw., *Dicranella heteromalla* Schp., *Orthodontium gracile* Schwaeg. var. *heterocarpa* is abundant, occurring on peat and bark of trees in the area.

The ground above Agden Dyke develps into a Calluna-Vaccinium moor, both species of Vaccinium occur with the hybrid *V. myrtillus* × *vitisidaea*. The following plants have scattered localities in the district : *Hypericum humifusum* L., *Stachys ambigua* Sm., *Callitriche intermedia* Hoffm., *Jasione montana* L., *Rorippa sylvestris, Prunus padus* L., *Potentilla procumbens* Sibth.

ORNITHOLOGY.—Mr. Leonard Carr writes : The Bradfield area is a good one for ornithologists, but it is rather a variable one. This is one of the few Sheffield localities in which Woodcock may be found. Possibly all three Woodpeckers may be seen. The valley birds should include Dipper, Grey, Yellow and Pied Wagtails, and Sandpiper. It is not a good area for Warblers, but the Willow-Warbler may be seen. The high ground may yield Lapwing, Twite, Short-eared Owl, Curlew, Golden Plover, Dunlin, and possibly Black Grouse. There will be Pheasant and Red Grouse. Although there will be little song, the common song birds will be found ; also Meadow Pipit, Kestrel, Merlin and Sparrow-Hawk. The only Duck to be seen at this time of the year will probably be Mallard and Tufted. The crow family may be represented by Carrion, Rook, Jay, Magpie and Jackdaw. Possibly a few Gulls may be seen. The list obtained should be a good one.

GEOLOGY.—Mr. W. H. Wilcockson writes : Bradfield lies on the upper beds of the Millstone Grit Series which consists of alternating massive grits and shales. The rocks here dip towards the east and, to the west of the village, the Rivelin and Kinder Scout Grits make high escarpments facing west with wide heather-covered moors as their dip slopes. The shales crop out below the grit beds on the escarpment faces and in the valleys and in places, especially just above the grit beds, they contain bands of marine fossils, Goniatites, etc. The area is cut by several faults, mostly with a N.W.-S.E. trend. Because of the hardness of the grit beds, both strike and dip streams flow in deep steep-sided valleys.

MEETING.—This will be at Strines Inn following the tea and prior to the start of the return bus at 6 p.m. Any new members will be elected and reports of the various sections will be given.

CIRCULAR No. 508

Yorkshire Naturalists' Union.

President:
A. RAISTRICK, M.Sc., Ph.D., F.G.S., King's College, Newcastle-on-Tyne.

General Secretary:
CHRIS. A. CHEETHAM, F.R.E.S., Austwick, via Lancaster.

Hon. Treasurer:
J. D. HARTLEY, Linton Avenue, Boston Spa.

The 508th Meeting

The Autumn Fungus Foray

WILL BE HELD AT

MALTON

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Recorders: W. G. BRAMLEY, Esq., Pallathorpe, Bolton Percy, York; Dr. J. GRAINGER, Auchincruive by Ayr.

Secretary: Miss J. GRAINGER, Wilshaw, Meltham, Huddersfield.

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WORKROOM.—This will be at Headquarters.

PERMISSION has been kindly given for Hovingham Park by Sir William Worsley; for Castle Howard by Mr. G. Howard.

The Castle Howard and Hovingham Woods should prove interesting ground both for the larger fungi and for Micro-species.

CHAIRMAN'S ADDRESS.—Mr. Webster will deliver his Address on Saturday, 23rd September, before the Annual Meeting. The subject is ' Common Pyrenomycetes of Beechwood.'

ANNUAL MEETING at Rockingham Guest House at approximately 8 p.m. on 23rd September.

PUBLIC MEETING.—Dr. J. Grainger will give a lantern lecture, ' Crop Diseases—a Serious Loss to Agriculture.'

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Circular No. 509

Yorkshire Naturalists' Union.

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General Secretary:
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Hon. Treasurer:
J. D. HARTLEY, Linton Avenue, Boston Spa.

Sectional Meetings, 1950

to consider the Annual Reports and nominate Officers for the Sections and their Committees.

October 7th.—Leeds Church Institute, Committee Room. The **Geological Section** meet at 2-30 p.m. The **Freshwater Biological Section** at 3-30 p.m. The **Conchological Section** meet at the Geological Department, Leeds University.

October 14th.—**The Botanical Section** will meet in the Botanical Department, Leeds University. This will be preceded by a Meeting of the **Phenological Committee** at 2-30 p.m.

After tea there will be an exhibition of specimens to which members are invited to contribute.

October 21st.—The meetings of the **Vertebrate Zoology Section** will be held at the Belgrave Rooms, New Briggate, Leeds :

2-0 p.m. Wild Birds and Eggs Protection Acts Sub-Committee (for members only).

2-30 p.m. Spurn Observatory and Ringing Sub-Committee (for members only).

2-45 p.m. Committee for Ornithology.

3-0 p.m. Mammals, Reptiles, Amphibians and Fishes Committee.

3-15 p.m. Vertebrate Zoology Section.
A paper will be read if time permits.

5-45 p.m. Vertebrate Zoology Section Evening Meeting.
To hear papers and see films.

October 28th.—The **Entomological Section** will meet in the Committee Room of the Leeds Church Institute, Albion Place, at 2 p.m. This will be followed by an exhibition of specimens to which members are asked to contribute.

November 4th.—A meeting of the **Executive** will be held in the Board Room, Leeds University, at 3 p.m. The entrance is opposite the Town entrance to the University, which is in University Road.

December 2nd.—**The Annual Meeting** of the Union will be held in the Cartwright Memorial Hall, Manningham Park, Bradford, when the Lord Mayor of Bradford will welcome the members to the City.

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